



California Regional Water Resources Control Board

Central Coast Region



Linda S. Adams
Agency Secretary

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Arnold Schwarzenegger
Governor

April 11, 2008

David Koch, Director
City of Watsonville
250 Main St.
Watsonville, CA 95076

Mary Bannister, Director
Pájaro Valley Water Management Agency
36 Brennan Street
Watsonville, CA 95076

Dear Mr. Koch and Ms. Bannister:

MASTER RECLAMATION PERMIT ORDER NO. R3-2008-0039, CITY OF WATSONVILLE AND PAJARO VALLEY WATER MANAGEMENT AGENCY, SANTA CRUZ COUNTY

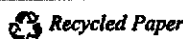
Attached are the following for your review and comment:

1. Draft Master Reclamation Permit (Permit) Order No. R3-2008-0039 and Monitoring and Reporting Program (MRP) No. R3-2008-0039 for the City of Watsonville (Supplier) and the Pájaro Valley Water Management Agency (Distributor).
2. Staff Report describing proposed waste discharge requirements for the Recycled Water Facility operated by the Supplier and water reclamation requirements for the Coastal Distribution System operated by the Distributor.
3. January 1984 *Standard Provisions and Reporting Requirements for Waste Discharge Requirements*. The Standard Provisions are subject to comment but are not usually revised. Please retain this copy of the Standard Provisions, as a second copy will not be mailed with later versions of this Order.

Staff plans to present the Permit for the Board's consideration and discussion at its regularly scheduled public meeting on **July 11, 2008**, in Watsonville. Please submit your comments to the Board's Executive Officer no later than **May 16, 2008**.

If you have comments or questions regarding the proposed MRPs, please contact **Michael Higgins at (805) 542-4649 or mhiggins@waterboards.ca.gov** or Burton Chadwick at (805) 542-4786.

California Environmental Protection Agency



April 11, 2008

Sincerely,



Roger W. Briggs
Executive Office

Attachment:

Draft Master Reclamation Permit Order No. R3-2008-0039

cc's: (with attachment)

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California Environmental Protection Agency

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**STATE OF CALIFORNIA
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION**

STAFF REPORT FOR REGULAR MEETING OF JULY 11, 2008

Prepared on March 26, 2008

ITEM NUMBER:

SUBJECT: Adoption of Master Reclamation Permit Order No. R3-2008-0039, City of Watsonville (Supplier of Recycled Water) and Pájaro Valley Water Management Agency (Distributor of Recycled Water), Santa Cruz County

KEY INFORMATION:

Treatment System Location:	401 Panabaker Lane, Watsonville
Discharge Type:	Tertiary-treated recycled wastewater
Design Capacity:	7.7 million-gallons-per-day (mgd), or 4,000 acre-feet-per-year (AFY)
Treatment:	Coagulation-flocculation-sedimentation, cloth media filtration, ultraviolet light disinfection
Disposal:	None
Reclamation:	Agricultural irrigation
Existing Orders:	None

I. SUMMARY

The attached Master Reclamation Permit (Permit) proposed today for the Board's consideration specifies waste discharge requirements for the Supplier's Recycled Water Facility (Recycling Plant) and water reclamation requirements for the distribution of recycled water through the Coastal Distribution System (Distribution System). Compliance with the comprehensive requirements for recycled water production and use should protect the public health and the quality of groundwaters underlying the reuse areas. Therefore, staff recommends the Board adopt Master Reclamation Permit No. R3-2008-0039, which includes Monitoring and Reporting Program (MRP) No. R3-2008-0039.

II. BACKGROUND

As documented in numerous groundwater studies conducted over the past five decades, the Pájaro Valley groundwater basin is in an overdraft condition. An overdraft condition occurs when the amount of water withdrawn exceeds the amount of water replenishing the basin. The rate of seawater intrusion in the groundwater basin has also been increasing in recent years. The combination of overdraft conditions and seawater intrusion has impaired the beneficial uses of the groundwater for municipal and domestic supply and for agricultural irrigation. The impairment has limited the fresh groundwater supply needed to sustain the long-term agricultural and urban economy of

the Pájaro Valley. Appendix 1 to this staff report, the United State Geological Survey's Fact Sheet entitled *Geohydrology of Recharge and Seawater Intrusion in the Pájaro Valley*, provides detailed information on seawater intrusion into potable groundwaters in the Pájaro Valley.

In 1984, the State Legislature formed the Pájaro Valley Water Management Agency (PVWMA, hereafter the Distributor), whose goals are, among others, to reduce long-term overdraft and to eliminate seawater intrusion in the Pájaro Valley. Accordingly, the Distributor characterized the groundwater basin's hydrogeology, estimated the sustainable annual water yield and the amount of overdraft, characterized the extent of seawater intrusion, and developed a Basin Management Plan (Plan) to achieve its goals. The Plan describes the project recommended to achieve the Distributor's goals, the Recommended Alternative (Proposed Project). The full revised Plan is at www.pvwma.dst.ca.us under Basin Management Plan. The Plan provides more detailed information on the groundwater basin's geology, hydrology, groundwater levels and quality, seawater intrusion and the Proposed Project. Much of the Plan's information and data date back to 1998; this staff report updates the information and data as necessary.

III. INTRODUCTION

The Proposed Project combines water conservation and water supply development, including the Watsonville Area Water Recycling Project (Recycling Project). The Recycling Project comprises the production and distribution of recycled water to irrigate farmlands near Monterey Bay.

To the extent the issues relate to understanding the causes of the groundwater's beneficial use impairment and to measures directed at restoring those uses, the Discussion below summarizes the following:

- The Pájaro Valley groundwater basin's hydrogeology;
- Demonstration of seawater intrusion and beneficial use impairment based on water quality data;
- The Recycling Plant treatment processes;
- The Distribution System operation, and
- The Permit's waste discharge and water reclamation requirements.

IV. DISCUSSION

A. BENEFICIAL USE IMPAIRMENT

1. **Geology and hydrology.** The fundamental understanding of the geologic structure of the groundwater basin has not changed significantly since the State Water Resources Control Board's first evaluation in 1953, although the amount of information has increased. The water-bearing units in the Pájaro Valley include alluvial, dune sand, and terrace deposits, and the various layers of the permeable Aromas Sand (a formally designated geological formation consisting chiefly of sand) and the moderately permeable Purisima Formation. The majority of wells producing

usable water have been developed in the alluvium and Aromas Sand in the upper 1,000 feet of the groundwater basin.

The alluvial materials generally comprise the upper 100 to 200 feet of the basin and vary greatly in composition. The upper part of the Aromas Sand is found beneath the alluvium, roughly 100 to 200 feet below sea level, and is the most intensively pumped. The lower part of the Aromas Sand extends to approximately 900 feet below sea level near the mouth of the Pájaro River. The geologic formations provide no barrier to seawater intrusion.

The Pájaro River is the largest coastal stream, measured by annual flows, between San Francisco Bay and the Salinas River. It contributes substantial surface inflow to the Pájaro Valley groundwater basin. The primary sources of recharge to the Pájaro Valley groundwater basin are infiltration of rainfall, seepage of streamflow from the Pájaro River and its tributaries, and percolation of irrigation water. Recharge areas for the deeper water-bearing zones mainly exist in the Pájaro Valley's eastern portion.

2. **Groundwater levels.** Groundwater levels in the basin vary annually depending on weather conditions, recharge, groundwater pumping, and other factors. However, the Pájaro Valley groundwater levels have generally fallen due to excessive pumping. The decline in groundwater levels has not been uniform since hydrologic conditions and other factors affect groundwater levels. This is confirmed by existing well data maintained by the Distributor. As mapped in Appendix 2, the Distributor installed five monitoring well clusters in the area proposed for irrigation with recycled water (PV1, PV3, PV4, PV6, and PV8). Each cluster of three wells monitors the shallow, middle, and deeper water-bearing zones. The shallow wells monitor the alluvium while the middle and deeper wells monitor different intervals within the Aromas Sand. The Distributor monitors the wells regularly for groundwater elevations and constituents of concern, including total dissolved solids, sodium, nitrate, and chloride.

Historically, groundwater levels were higher than today in inland areas, and artesian conditions existed near the coast, causing water to surface in some of the coastal areas. Under such conditions, seawater could not intrude into freshwater aquifers. However, by the 1940s, with the major development of groundwater resources to support a growing agricultural industry, some wells were still artesian, but only during winter months. By the 1970s, water levels west of Watsonville were consistently below sea level from approximately May to December, often never recovering to levels above sea level. These conditions caused seawater to enter the freshwater aquifers near the coast.

Much of the Pájaro Valley's groundwater generally moves from the various unconfined recharge areas in the eastern valley toward a large pumping trough that forms in the center of the valley near Watsonville. Also, seawater flows from the ocean toward the pumping trough. Well data indicate depressed groundwater levels

are expanding in the Pájaro Valley aquifers. It is notable that current well levels near the coast are similar to historic levels, but groundwater in many wells is becoming increasingly salty due to seawater intrusion.

3. **Pollution due to seawater intrusion.** The Pájaro Valley groundwater basin is connected to the ocean, and no seismic faults or barriers exist to prevent seawater intrusion. The average concentration of chloride in seawater is 19,000 milligrams per liter (mg/L). According to the Basin Plan, chloride levels in irrigation water exceeding 142 mg/L will likely impair the development of crops exposed to the water, thereby impairing the agricultural supply (AGR) beneficial use.

Increasing chloride concentration in groundwaters is a good indicator of seawater intrusion. Chloride is useful for monitoring intrusion because it is chemically stable and moves at the same rate as the intruding seawater. The horizontal migration of seawater occurs slowly as seawater mixes with the fresh water as it moves inland. Initially, chloride concentrations increase gradually. However, as the bulk of the seawater plume moves inland, chloride concentrations can rise rapidly.

Based on background chloride concentrations in groundwater from inland recharge areas, in 1974, the U.S. Geological Survey determined that chloride levels exceeding 100 mg/L in coastal wells indicate seawater intrusion.

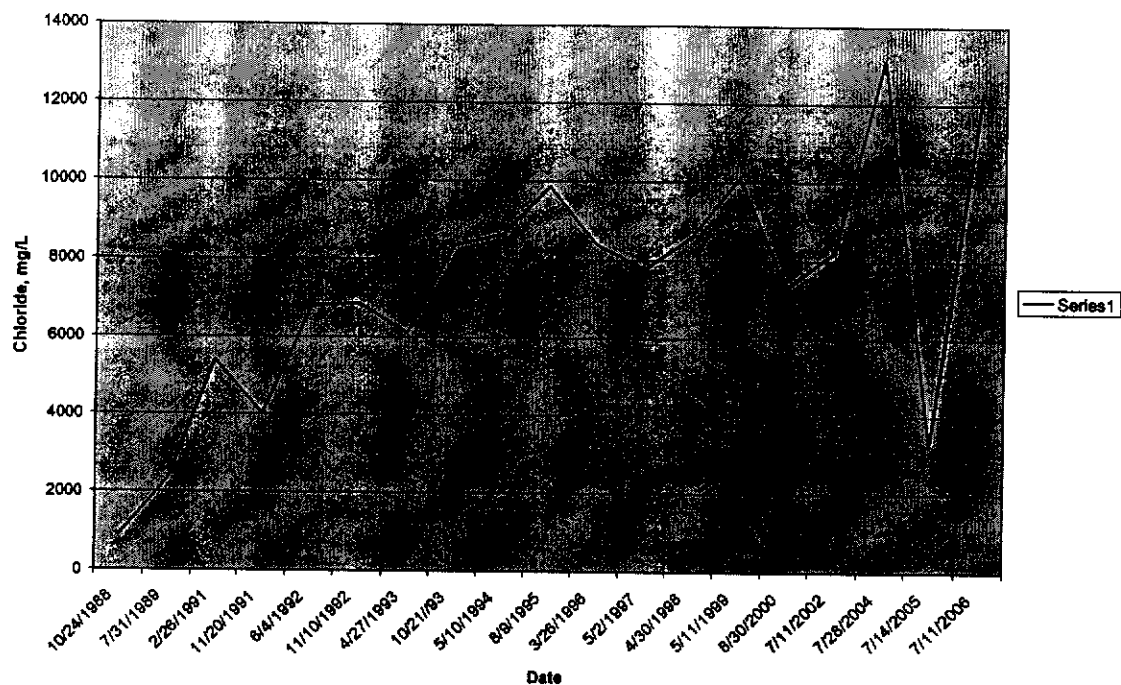
Well data from 1998 until the present generally indicate that inland seawater intrusion is extensive. Maps provided in Appendices 3 through 6 show the extent of the intrusion in 1951, 1966, 1998, and 2005.

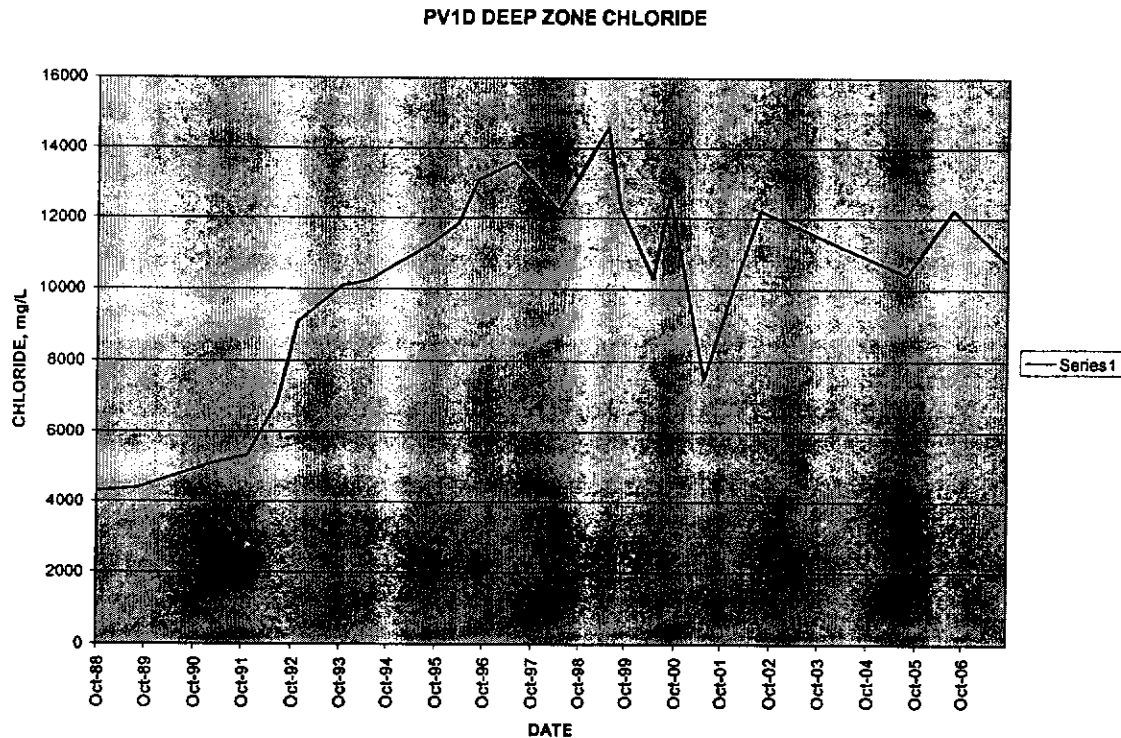
A number of deeper wells have shown substantial increases in chloride concentrations in recent years, indicating that the volume of fresh water displaced in the intruded area is increasing. Chloride levels are generally highest in the deeper confined aquifers consisting of Aromas Sand and the Purisima Formation, with values ranging from 200 to 8,500 mg/L. In contrast, shallow wells tend to have lower chloride levels (50 to 500 mg/L), and a number of neighboring shallow wells show marked differences in chloride levels.

The data indicate that seawater is intruding along the coast in the middle and lower portions of the Aromas Sand and that poor-quality water is present in the deeper production zones. This implies, as intrusion moves inland and wells are lost to seawater impacts, that the option of drilling deeper for better quality water is probably not a viable option.

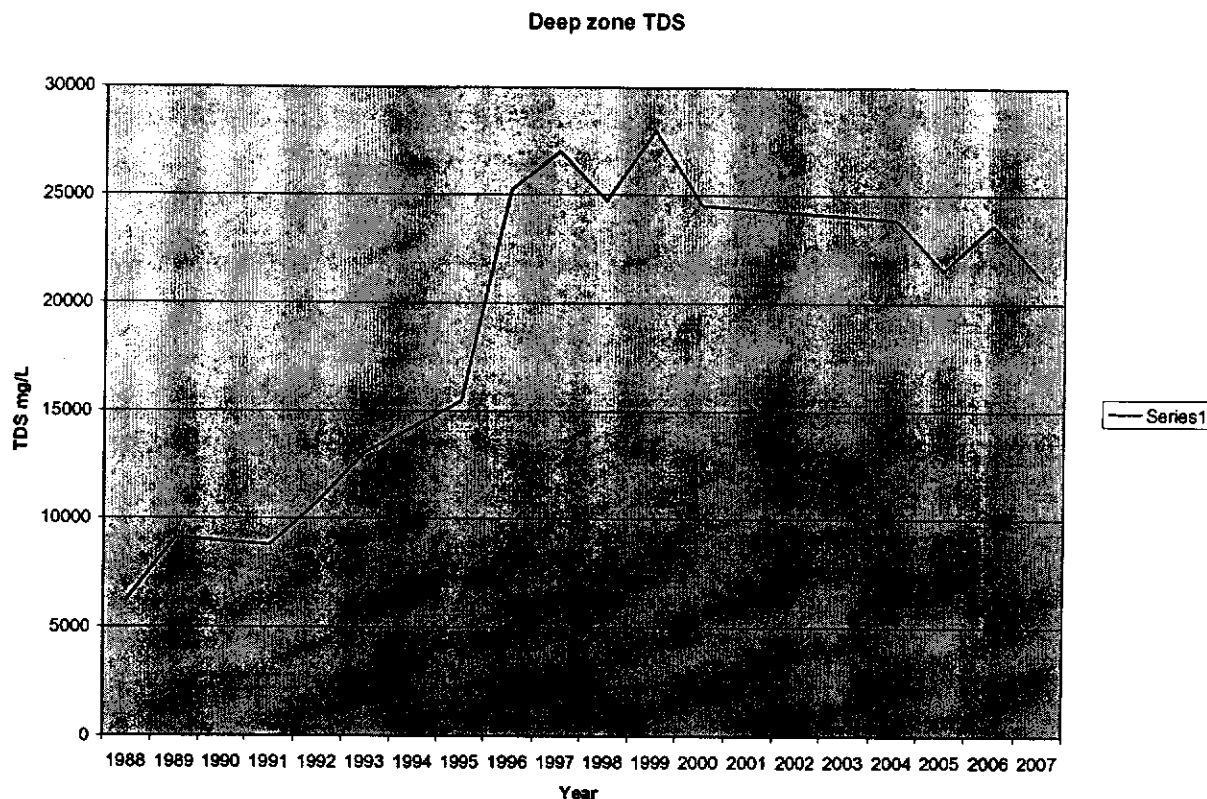
The following graphs plot chloride concentrations over time in a monitoring well cluster (PV1) near the coast. See Appendix 2 to this staff report for well cluster locations. The data are current up to August 2007 and demonstrate that seawater is intruding into deeper permeable formations.

PV1 MEDIUM DEPTH CHLORIDE





The groundwater monitoring data for total dissolved solids (TDS) also demonstrate seawater intrusion into the water supply aquifers. The average TDS concentration from 2004 through 2007 in the medium zone PV1 well averaged 13,580 mg/L and exceeded 20,000 mg/L in the deep zone during the past four years, as illustrated in the following graph. The average TDS concentration in seawater is 33,000 mg/L.



4. **Groundwater nitrate pollution.** The City of Watsonville monitors nitrogen concentrations in effluent from its municipal wastewater treatment facility (WWTF). The annual average concentration of 21 mg/L nitrate as nitrogen (95 mg/L as nitrate) is substantially greater than the water quality objective the enforceable Maximum Contaminant Level (MCL) of 10 mg/L as nitrogen (45 mg/L as nitrate), as noted below in section 5. Since any ammonia nitrogen or urea nitrogen in the WWTF effluent will convert almost entirely to nitrate in the soil, it poses a threat to underlying groundwater and must be managed accordingly.

Groundwater samples from the PV well clusters have contained varying nitrate levels in shallow, medium and deep water-bearing zones. Nitrate in many samples exceeded the MCL by several times. Therefore, the groundwaters' beneficial use for municipal and domestic supply (MUN) is impaired, likely due to the application of nitrate fertilizer over many years. The WWTF cannot have contributed because it has always discharged into the ocean. However, during the season of irrigation with recycled water, the Distributor will send the nitrogen from the WWTF to farmlands. The Nitrate Management Plan, required in the proposed Permit and discussed below, seeks to balance the nitrogen in the recycled water with fertilizer nitrogen, and thereby protect groundwater quality.

- 5. Water quality standards.** The Central Coast Water Quality Control Plan's (Basin Plan) Section II.A.4. (Objectives for Groundwater) provides both narrative and numeric groundwater quality objectives for the MUN and agricultural supply (AGR) beneficial uses. The narrative water quality objectives refer to MCLs for drinking water supply provided in California Code of Regulations, Title 22, Division 4, Chapter 15. The recommended MCL for TDS in drinking water is 500 mg/L. The nitrate MCL is 10 mg/L as nitrogen.

The Basin Plan states that "ground waters shall not contain concentrations of chemical constituents in amounts that adversely affect beneficial uses" and provides that "interpretation of adverse effect shall be as derived from the California Agricultural Extension Service guidelines provided in Table 3-3" on page III-14 of the Basin Plan. Table 3-3 provides that irrigation water containing chloride in excess of 142 mg/L may cause increasing problems to crops and/or soils. The Basin Plan is at www.waterboards.ca.gov/centralcoast under Basin Plan.

Beneficial use impairment. Comparison of chloride and TDS groundwater analyses presented above with water quality objectives demonstrates that seawater intruding into the freshwater-bearing zones has impaired the MUN and the AGR beneficial uses. Moreover, as discussed above, excessive pumping for mainly agricultural uses caused the seawater to intrude. In addition, it is likely that excessive fertilizer use on area farmlands has increased the groundwater nitrate concentration to levels where the MUN beneficial use is impaired.

B. MEASURES TO ADDRESS BENEFICIAL USE IMPAIRMENT

1. USE OF RECYCLED WATER FOR AGRICULTURAL IRRIGATION

An assessment of recycling opportunities identified agricultural irrigation in the coastal portion of the Pájaro Valley as the best opportunity for the use of recycled water. Agriculture in the Pájaro Valley generates hundreds of millions of dollars in revenues each year. The Pájaro Valley produces a variety of vegetable crops, many of which may be consumed raw. In the mid-1970s, the Water Board completed a water quality management plan for the area; the plan recommended use of recycled water for crop irrigation.

At that time, agricultural irrigation of vegetable crops with recycled water was not widely accepted. To respond to concerns from the agricultural community, the Monterey Regional Water Pollution Control Agency sponsored an 11-year, \$7-million pilot and demonstration project known as the Monterey Wastewater Reclamation Study for Agriculture (Reclamation Study). Study objectives were to answer questions about virus and bacteria survival on crops, soil permeability, and yield and quality of crops, and to demonstrate field operations for the farmers who would use reclaimed water.

Study participants conducted five years of field operations, irrigating crops with two types of tertiary-treated wastewater, with an irrigation well-water control for

comparison. Artichokes, broccoli, cauliflower, celery, and several varieties of lettuce were grown on test plots and a demonstration field. Crops produced with recycled water were healthy and vigorous, and the irrigation system operated without complications. No bacteria or viruses were found in recycled water used for irrigation or on samples of crops grown with the water. No tendency was found for metals to accumulate in soils or on plant tissues. Soil permeability was not impaired. The results of the study provided evidence that using recycled water can be as safe as irrigating with well water, and that large scale water reclamation can be accomplished.

2. RECOMMENDED ALTERNATIVE (PROPOSED PROJECT)

The Revised Basin Management Plan describes the Proposed Project. The Proposed Project's goal is to balance the outflow and inflow of groundwater from the basin and eliminate seawater intrusion in the Pájaro Valley. Since the Reclamation Study demonstrated the safety of recycled water for crop irrigation, the Distributor will use as much recycled water the Supplier can provide to substitute for pumped groundwater supplies.

a. Phased implementation. The Supplier and Distributor plan to implement the Proposed Project in two phases. Phase 1 comprises the following components:

- A water conservation program, which will reduce demand by 5,000 AFY;
- The Harkins Slough project, which will supply 1,100 AFY;
- The Harkins Slough portion of the Distribution System;
- A water metering program and
- A water resource monitoring program.

The Distributor has completed Phase 1.

Phase 2 comprises the following:

- The remaining portion of the Distribution System;
- The Recycling Plant, which will provide 4,000 AFY, and
- Watershed management programs, including a nitrate management program (Nitrate Plan), a wells management program, and a recharge area protection program.

As discussed below, the Central Valley Project (CVP) waters would have been included in Phase 2.

b. Water supply. The Proposed Project as initially conceived would have imported up to 13,400 AFY from the CVP pipeline near Gilroy through a 54-inch diameter, 23-mile long pipeline.

However, the import pipeline plan may never be built because of its high cost and other factors. To replace the lost CVP water, in the near term, the Distributor plans to supply the Distribution System with a blend of recycled water, local groundwater and City of Watsonville potable water. To meet local agricultural demands, the Harkins Slough portion of the project will provide up to 800 AFY from groundwater wells and up to 600 AFY from local recharge wells while the City portion of the

project will provide up to 1,600 AFY of potable water. Added to the 5,000 AFY in reduced demand resulting from conservation, 4,000 AFY from the Recycling Plant, 1,000 AFY from the Harkins Slough project, the Distributor predicts that the total supply should make up for the water pumped along the coast and bring the groundwater basin into balance. As stated, the elimination of overdraft conditions should begin to halt seawater intrusion and begin to restore the groundwaters' currently impaired beneficial uses.

To address longer term water supply needs, the Distributor is actively involved in the Integrated Regional Water Management Plan (Regional Water Plan) process, which may identify alternatives to importing CVP water. The Regional Water Plan process will analyze a number of potential strategies of mutual benefit with two inland water districts, and it is hoped the process will identify new, feasible options to cooperatively fund and build a "multi-purpose" import pipeline. The Distributor adopted the Regional Water Plan in 2007.

Options include purchasing excess CVP water from the Santa Clara Valley Water District, which needs the water only during drought years, and/or from the San Benito County Water District, which also owns excess CVP water. The Distributor plans to use the water to either recharge the groundwater basin near the coast or provide the water for irrigation.

- c. **Recycling Plant.** Secondary effluent contains substantial quantities of colloidal solids, which harbor potentially harmful bacteria and do not settle out of the wastewater. To kill or remove all potentially harmful bacteria and to comply with the Title 22 water recycling criteria, the Supplier must employ a third series of treatment processes; that is, tertiary treatment. Tertiary treatment proposed for the Recycling Plant comprises coagulation-flocculation-sedimentation (CFS), cloth media filtration, and ultraviolet disinfection. The CFS and filtration process reduce the solids to very low levels, which allows the subsequent disinfection process to remove almost all the remaining bacteria and the associated health threat. The Recycling Plant will treat secondary-treated effluent from the City's existing wastewater treatment facility to tertiary standards for distribution through the Distribution System to irrigation water use areas. The Recycling Plant design flowrate is 7.0 million gallons per day which approximates 4,000 AFY, as noted above. Appendix 7 to this staff report provides a more detailed description of the Recycling Plant's unit processes.
- d. **Distribution System.** The Distributor will operate the Distribution System, which will comprise 31 miles of pipeline to provide recycled water to 238 users of 9,500 acres of irrigated farmlands. The Distributor will blend the recycled water with low concentrations of groundwater pollutants (TDS, sodium, chloride, and nitrate). The Distributor's next goal is to install backflow preventers and other hardware to enable the Distribution System to distribute the recycled water to the use areas in compliance with the Permit as discussed below.

e. Oversight of recycled water system operations

Agency Supervisor. The Distributor plans to select an Agency Supervisor to oversee all programs and facilities related to the use of recycled water. The Agency Supervisor will be required to:

- Know the entire recycled water distribution system and all water reuse criteria in the Permit;
- Be responsible for implementing and overseeing programs as required by the Permit;
- Represent the Distributor with the City and the Users in all matters related to recycled water;
- Ensure that all User Supervisors are properly trained regarding the use of recycled water; and
- Be responsible for monitoring and reporting subject to Permit requirements.

User supervisor. The Distributor plans to ensure the recycled water Users appoint a User Supervisor for each parcel receiving recycled water. The User Supervisor will ensure that recycled water users comply with water reclamation requirements in the Permit and the Water User's Handbook.

Specifically, the User Supervisor shall:

- Ensure that Users operate and maintain all on-farm facilities that serve recycled water in accordance with the Permit;
- Operate the on-farm irrigation system in a manner to prevent human consumption of recycled water, to control and limit runoff, and to prevent contamination of on-farm wells;
- Ensure that all personnel are educated in practices and procedures for working with recycled water;
- Install and maintain warning signs at the use site;
- Prevent cross-connection between recycled water and potable water facilities;
- Notify the Distributor, and prepare and submit reports when there are system failures that cause unauthorized recycled water discharges; and
- Request the Distributor approve proposed modifications or additions to recycled water facilities.

User Supervisors will be given a copy of the Permit and the Water User's Handbook for guidance on the use of recycled water. The User Supervisors will be required to have these available at all times for inspection by Water Board staff, the Distributor, the City or State/County Health Officers.

f. Watershed Management Programs proposed by the Distributor include a nitrate management program and a recharge area protection program.

Nitrate Management Program. The proposed nitrate management program includes the following components: a Nitrate Management Plan (Nitrate Plan) and

public outreach. The Nitrate Plan's goals are similar to the nitrate management plans of neighboring counties. In the Distributor's service area, most farmers add fertilizer to the irrigation water before its distribution to farmlands through a drip system. To conserve water and prevent the migration of nitrates to groundwaters, farmers need add only the amount of nutrients needed by the crops, to ensure that essentially no nitrate remains in the soil. Accordingly, the Distributor provides a free service to farmers. By monitoring soil moisture content and crop nutrient and water needs, the Distributor's service helps farmers optimize the quantities of fertilizer and water necessary for best crop growth. The Distributor plans to expand the service and conduct follow-up assessment to monitor its effectiveness. The Distributor also provides guidance to farmers in pocket guides:

- *On-farm Nitrogen Determination in Plant Sap, Soil, and Water* and
- *Using the Nitrate Present in Soil and Water in your Fertilizer Calculations.*

Used together, the guidance documents likely provide the best means to greatly reduce or eliminate nitrate entering groundwaters underlying the reuse areas. The guidance allows farmers to calculate the correct amount of fertilizer to add to the recycled water to optimize the nitrate in the irrigation water. Appendix 8 to this staff report provides the guidance documents.

Recharge area protection program. The County of Santa Cruz protects groundwater quality recharge areas through its land use permitting process. The County prohibits certain activities in recharge areas.

3. MASTER RECLAMATION PERMIT

- a. Statutory basis for requirements.** CWC §13523.1 provides that (a) Each regional board, after consulting with, and receiving the recommendations of, the State Department of Health Services and any party who has requested in writing to be consulted, with the consent of the proposed permittee, and after any necessary hearing, may, in lieu of issuing waste discharge requirements pursuant to Section 13263 or water reclamation requirements pursuant to Section 13523 for a user of reclaimed water, issue a master reclamation permit to a supplier or distributor, or both, of reclaimed water.

A master reclamation permit shall include, at least, all of the following:

- (1) Waste discharge requirements, adopted pursuant to Article 4 (commencing with Section 13260) of Chapter 4.
- (2) A requirement that the permittee comply with the uniform statewide reclamation criteria established pursuant to Section 13521. Permit conditions for a use of reclaimed water not addressed by the uniform statewide water reclamation criteria shall be considered on a case-by-case basis.

- (3) A requirement that the permittee establish and enforce rules or regulations for reclaimed water users, governing the design and construction of reclaimed water use facilities and the use of reclaimed water, in accordance with the uniform statewide reclamation criteria established pursuant to Section 13521.
- (4) A requirement that the permittee submit a quarterly report summarizing reclaimed water use, including the total amount of reclaimed water supplied, the total number of reclaimed water use sites, and the locations of those sites, including the names of the hydrologic areas underlying the reclaimed water use sites.
- (5) A requirement that the permittee conduct periodic inspections of the facilities of the reclaimed water users to monitor compliance by the users with the uniform statewide reclamation criteria established pursuant to Section 13521 and the requirements of the master reclamation permit.
- (6) Any other requirements determined to be appropriate by the regional board.

Proposed Master Reclamation Permit Order No. R3-2008-0039 includes these requirements, in addition to requirements for the Distributor to require each User to designate a Site Supervisor to oversee recycled water use. In addition, the Permit requires the Distributor to develop and implement the following:

- a Contingency Plan to take effect if recycled water does not comply with Permit limitations or specifications,
- a Groundwater Monitoring Well Workplan, and
- a Nitrate Management Plan.

Monitoring and Reporting Program (MRP) No. R3-2003-0039 requires comprehensive sampling to track the quality of recycled water supplied by the Distributor, the quality of the blended irrigation water distributed to the use areas, and the quality of groundwaters underlying the use areas. These data will demonstrate the effectiveness of the waste discharge requirements and water reclamation requirements at protecting groundwater quality. The MRP requires the Distributor to monitor the recycled water use areas for compliant irrigation practices; equipment repair including backflow devices; cross-connection tests, and other irrigation system features. The MRP requires quarterly and annual reporting of the acquired data.

RECOMMENDATION

Adopt master Reclamation Permit Order No. R3-2008-0039, as proposed.

ATTACHMENTS

1. Appendix 1 - USGS report on Seawater Intrusion in the Pájaro Valley
2. Appendix 2 - Map of recycled water use area monitoring well locations

3. Appendices 3 – 6 - Maps of extent of seawater intrusion over time
4. Appendix 7 - Recycled Water Facility Treatment Processes
5. Appendix 8 - Pocket Guides to Determine Agricultural Nitrogen Applications
6. Proposed Master Reclamation Permit No. R3-2008-0039 and Monitoring and Reporting Program No. R3-2008-0039
7. Standard Provisions and Reporting Requirements for Waste Discharge Requirements, January 1984

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Geohydrology of Recharge and Seawater Intrusion in the Pajaro Valley, Santa Cruz and Monterey Counties, California

APPENDIX 1

The U.S. Geological Survey (USGS) in cooperation with the Pajaro Valley Water Management Agency (PVWMA), has completed the collection and analyses of geologic, hydrologic, geophysical, and geochemical data in the coastal aquifer systems of the Pajaro Valley (fig. 1). These data were collected to delineate the geohydrologic framework of seawater intrusion, as well as, the source, age, and movement of ground water in the coastal aquifer systems (Hanson, 2003).

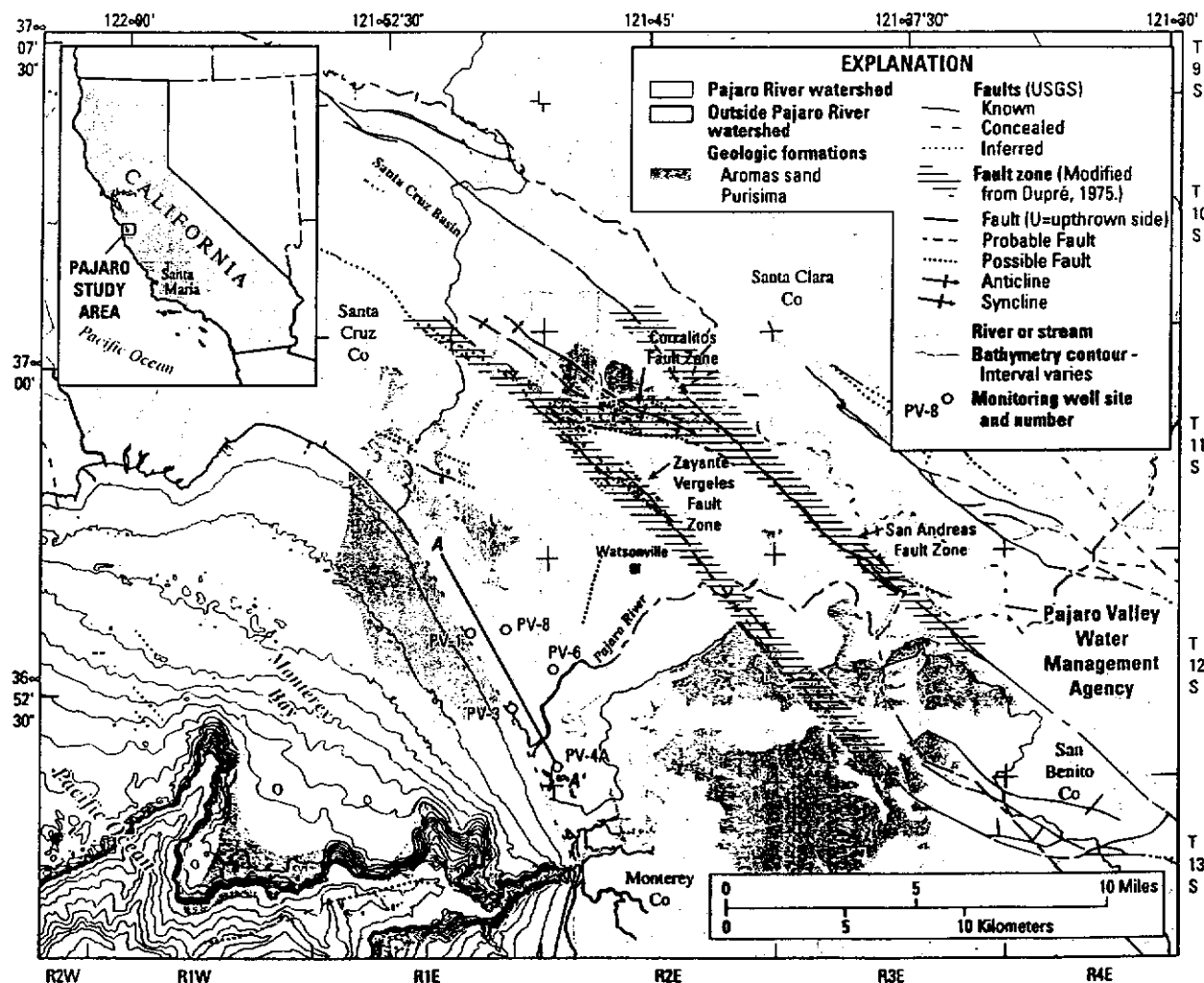


Figure 1. Location of Pajaro Valley Water Management Agency, Santa Cruz and Monterey Counties, California.

GEOLOGY

(1) Geophysical logs indicate confining beds that occur within older alluvium and in the upper and lower Aromas Sands (fig. 2).

(2) The layered terrestrial and marine deposits restrict seawater intrusion to zones of coarse-grained deposits (fig. 2).

HYDROLOGY

(1) Pajaro River streamflow and local runoff are the two sources of surface water available for ground-water recharge or additional water supply.

(2) Long-term water-level declines, climatic cycles of 2 to 19 years, and seasonal pumping all suppress water levels below seawater pressures and cause the landward flow of seawater (seawater intrusion) (fig. 3).

(3) The Pajaro River (Group 6) and local runoff (Group 7) (fig. 4) provide natural recharge to the ground-water flow system.

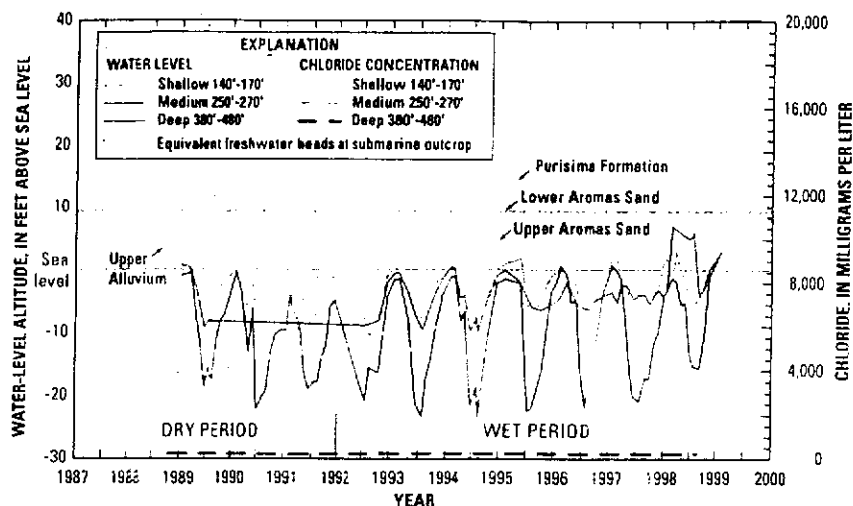


Figure 3. Water-level altitudes and chloride concentrations in well PV-3, Pajaro River watershed, Santa Cruz and Monterey Counties, California.

GEOCHEMISTRY

(1) Samples from coastal monitoring wells represent 5 groups of ground-water that differ from surface waters (groups 6 and 7) (fig. 4): (1) Recent fresh ground water; (2) Older fresh ground water; (3) Recent sea-

water intrusion; (4) Older sea water; and (5) Very old ground water.

(2) Stable isotopes indicate a mixture of older ground water and surface water in samples from coastal monitoring wells (Groups 1 and 2) in the upper-aquifer system (fig. 5).

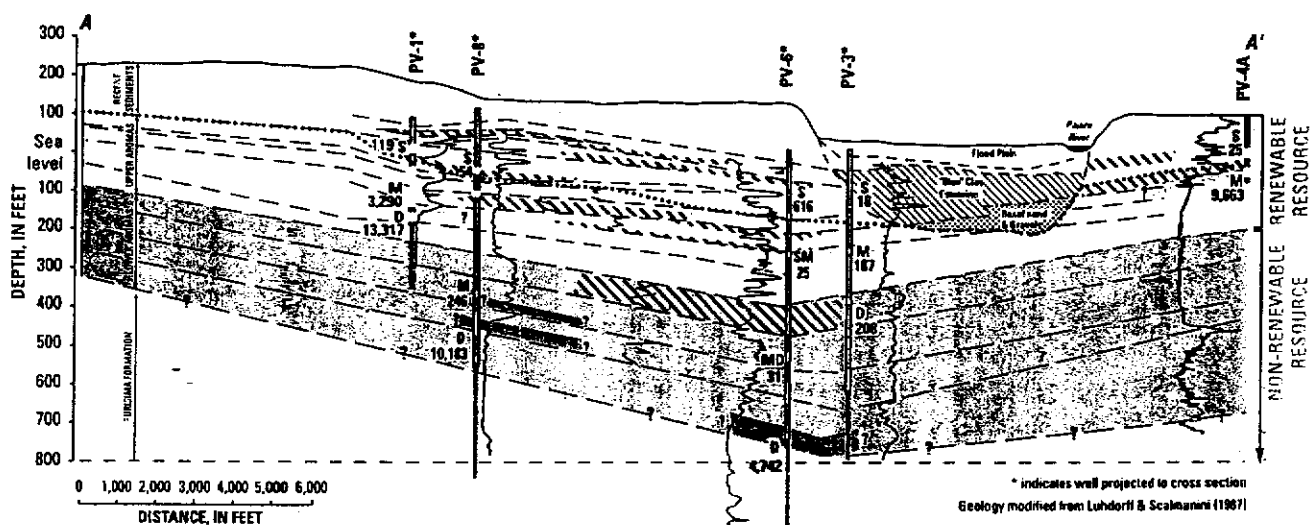


Figure 2. Cross section of the coastal aquifers showing seawater intrusion, chloride values in wells, perforated depths and generalized geology, Pajaro River watershed, Santa Cruz and Monterey Counties, California.

EXPLANATION			
Upper-aquifer system	Recent sea water	Well screen—no tritium	Well screen sample depth
Shallow alluvial aquifers	Older sea water	Well screen with tritium	S Shallow
Younger and older alluvium, undifferentiated	Selected fine-grained sediments	4,742 Chloride concentration, in mg/L for 1998 samples	SM Shallow-Medium
Upper Aromas Sand	Electrical-resistivity log		M Medium
Lower-aquifer system			MD Medium-Deep
Lower Aromas Sand			D Deep
Purisima formation			

GEOHYDROLOGIC FRAMEWORK

(1) Shallow wells are pumping water from the upper-aquifer system that consists of recently recharged shallow ground water. This water is a renewable resource as indicated by the presence of tritium (fig. 2) and younger carbon-14 ages (table 1).

(2) Deeper wells are pumping water from the lower-aquifer system that consists of older ground water that was recharged thousands of years ago and may represent a nonrenewable resource in the coastal region.

(3) Alternating layers of fine-grained and coarse-grained sediments retard the vertical movement of recharge and result in water-level differences that have persisted for many years (fig. 3).

(4) The primary structures of the aquifers includes a fault-bounded region adjacent to the Santa Cruz Mountains between the San Andreas and Zayante-Vergeles fault zones (Dupre, 1975) (fig. 1). The relation of faults such as the Corralitos fault and Zayante Faults and ground-water flow remains uncertain (fig. 1).

SEAWATER INTRUSION

(1) Two types of saline water occur within the aquifers of the Pajaro Valley—recent and older seawater.

(2) Recent seawater intrusion contains tritium (<50 years old) and is present in basal layers of coarse-grained sediments of the recent and older alluvium and within the upper Aromas Sands (figs. 2, 4, and 6). The stable isotope signature of water from wells in the Pajaro Valley with seawater intrusion differs from that in the adjacent Salinas Valley (fig. 5).

(3) Recent seawater intrusion at PV-1 was estimated to be as large as 60 percent of total seawater on the basis of chloride and stable-isotope

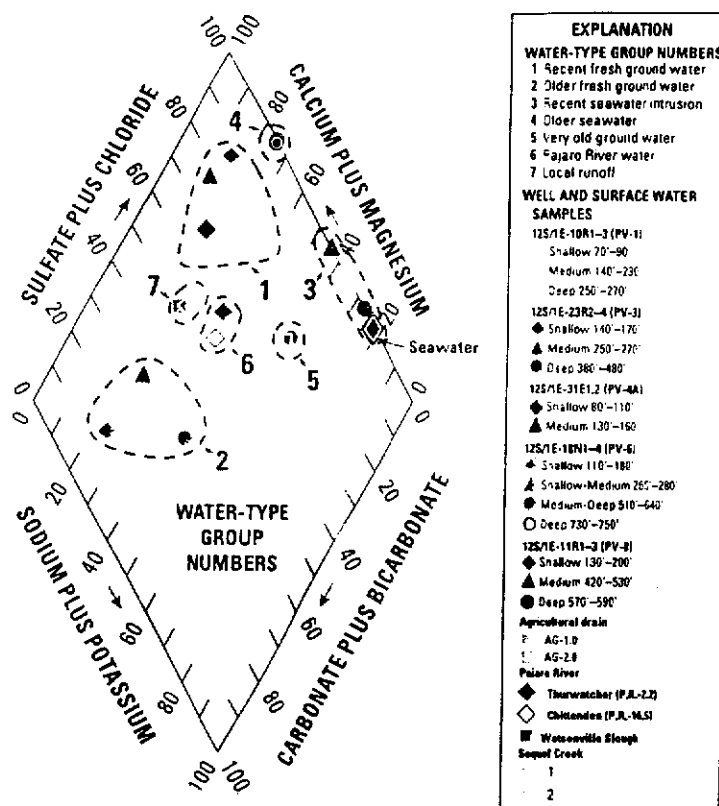


Figure 4. Chemical evaluation of water from wells and surface sites in the Pajaro River watershed, Santa Cruz and Monterey Counties, California.

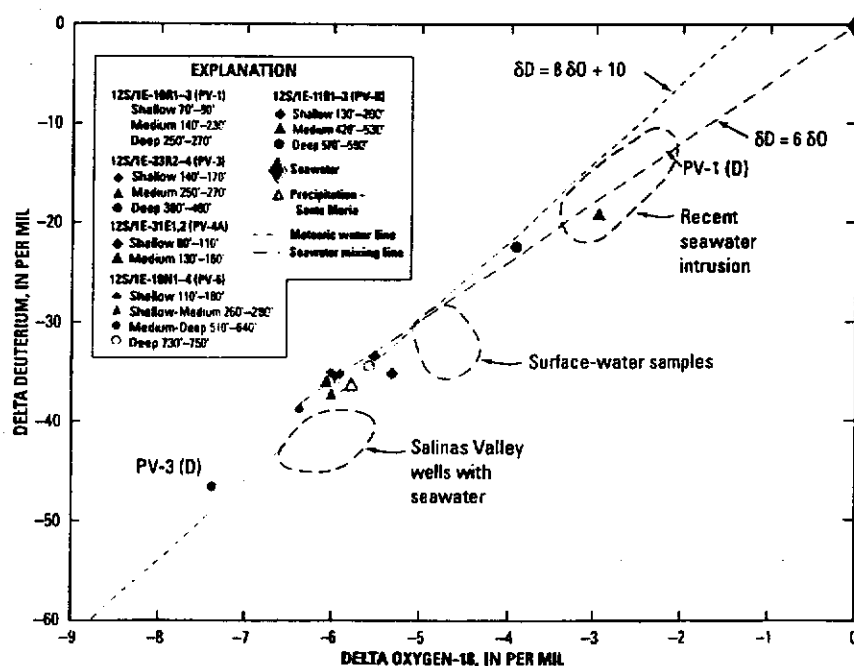


Figure 5. Isotope values for selected wells and surface water sites in the Pajaro River watershed, Santa Cruz and Monterey Counties, California.

Local Well Number (Screened interval, in feet below land surface)	Chloride Concentration (mg/L)	Total Dissolved Solids (mg/L)	Delta- oxygen-18 (per mil)	Delta- deuterium (per mil)	Tritium (pCi/L)	Uncorrected Carbon-14 Age (years before present)
PV-1 (S) (70-90)	120	650	-5.7	-35.4	18.08	<50
PV-1 (M) (140-230)	9,500	20,300	-3.27	-18.7	6.304	2,200
PV-1 (D) (250-270)	13,317	24,900	-2.25	-12.2	5.09	1,000
PV-3 (S) (140-170)	616	1,490	-6.4	-38.9	0.3	7,000
PV-3 (M) (250-270)	187	583	-6.01	-37.4	0.416	5,900
PV-3 (D) (380-480)	209	594	-7.38	-46.7	0.3	24,900
PV-4A (S) (80-110)	No Data	No Data	-5.32	-35.23	8.16	1,100
PV-4A (M) (130-160)	9,663	18,240	-2.96	-19.17	9.376	2,300
PV-6 (S) (110-180)	18	372	-5.9	-35.3	0.3	5,500
PV-6 (SM) (260-280)	25	291	-5.96	-35.8	0.3	6,100
PV-6 (MD) (510-640)	31	313	-6.01	-35.3	0.3	8,600
PV-6 (D) (730-750)	4,742	8,360	-5.57	-34.53	0.3	11,800
PV-8 (S) (130-208)	54	687	-5.52	-33.5	14.24	<50
PV-8 (M) (420-530)	246	575	-6.07	-35	0.3	6,500
PV-8 (D) (570-590)	10,183	20,580	-3.92	-22.5	0.3	8,100

percent younger due to the addition of inorganic carbon to ground water (Davis and Bentley, 1982). These waters are chemically and isotopically different from local surface waters and may have been recharged during a period with a colder climate.

— R. T. Hanson

Table 1. Selected water-chemistry constituents sampled from August 1998 through May 1999 for selected coastal monitoring wells, Pajaro Valley, California.

mixtures (table 1, fig. 5). The vertical extent of seawater intrusion has increased at PV-1 between 1988 and 1998 (fig. 6).

(4) Older seawater in the lower Aromas Sand (figs. 2 and 4) is saline ground water that is not recent seawater intrusion.

SOURCE, AGE, AND MOVEMENT

(1) Ground-water from shallow monitoring wells is generally less than 50 years old. These waters are chemically (fig. 4) and isotopically (fig. 5) similar to local surface waters and represent the renewable resource.

(2) Ground-water from deep monitoring wells have uncorrected ages from 1,000 to 24,900 years old (table 1), were recharged thousands of years ago and represent the nonrenewable resource in the coastal region. Corrected carbon-14 ages (not shown) can be as much as 100

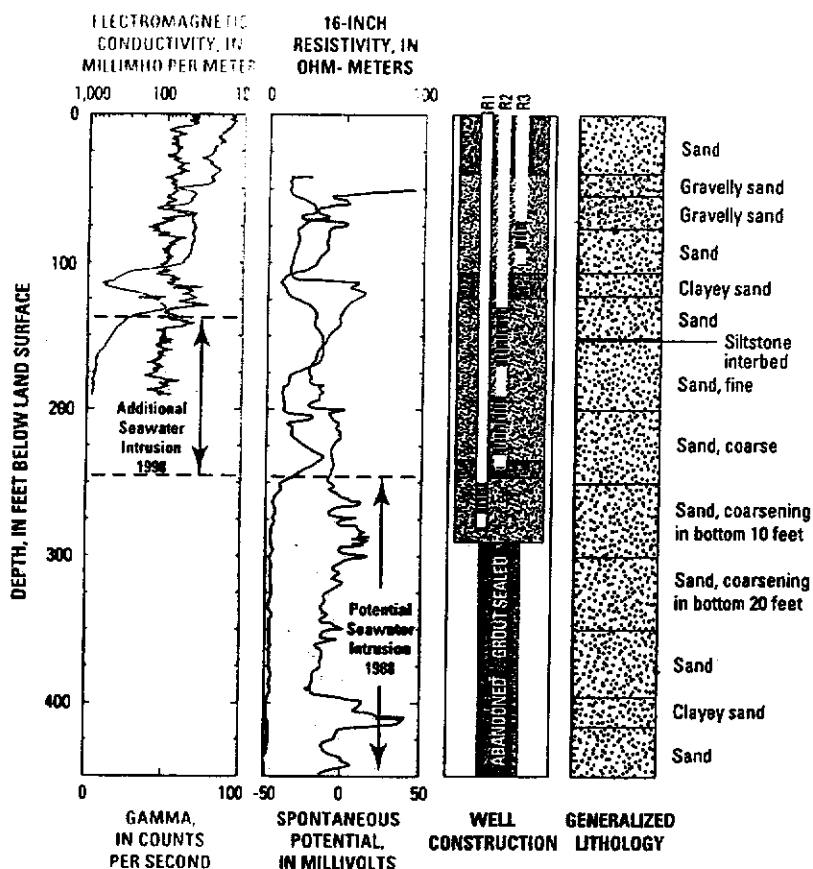


Figure 6. Geophysical logs, well construction, and lithology for monitoring well PV-1, Pajaro Valley, Santa Cruz County, California.

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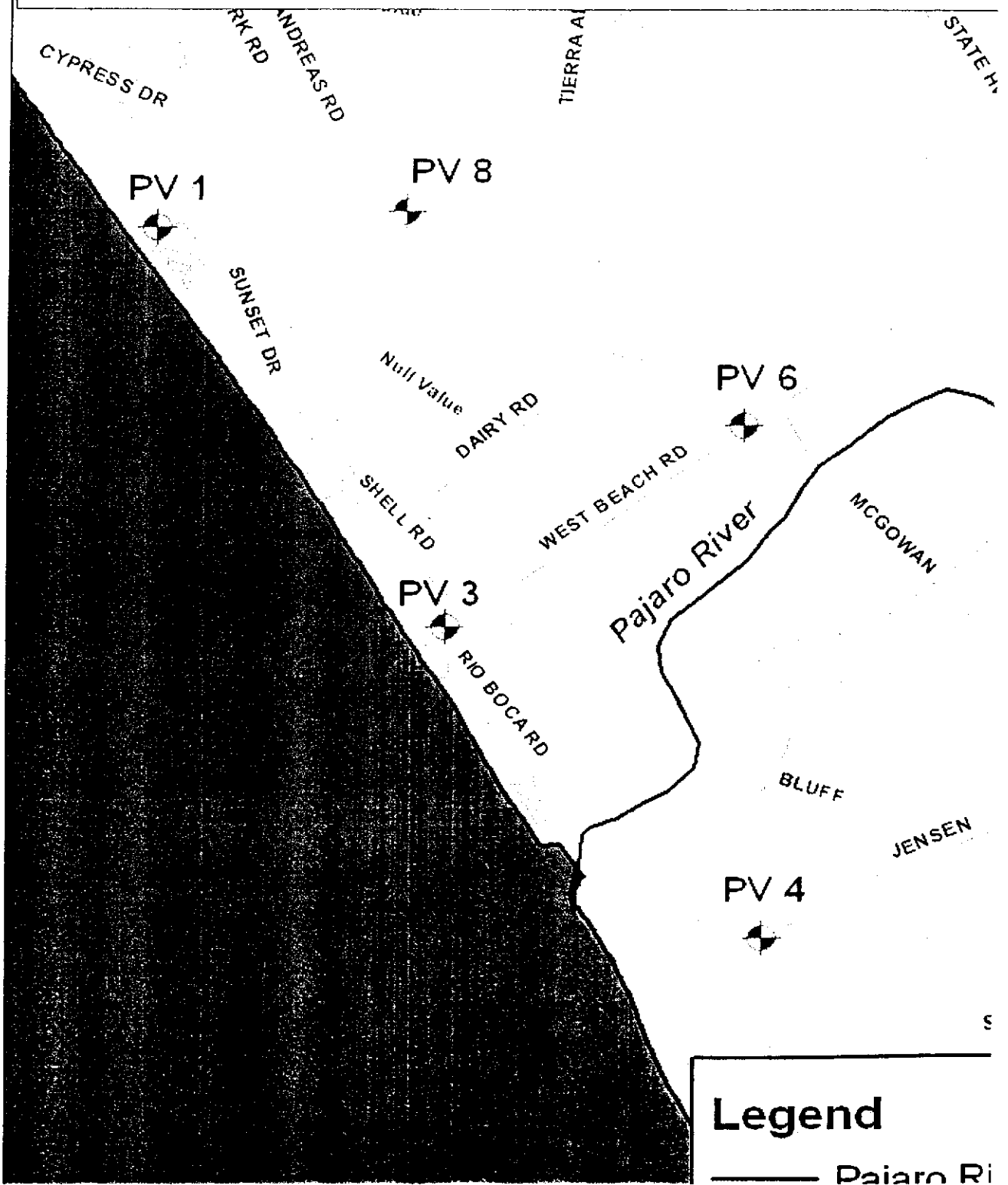
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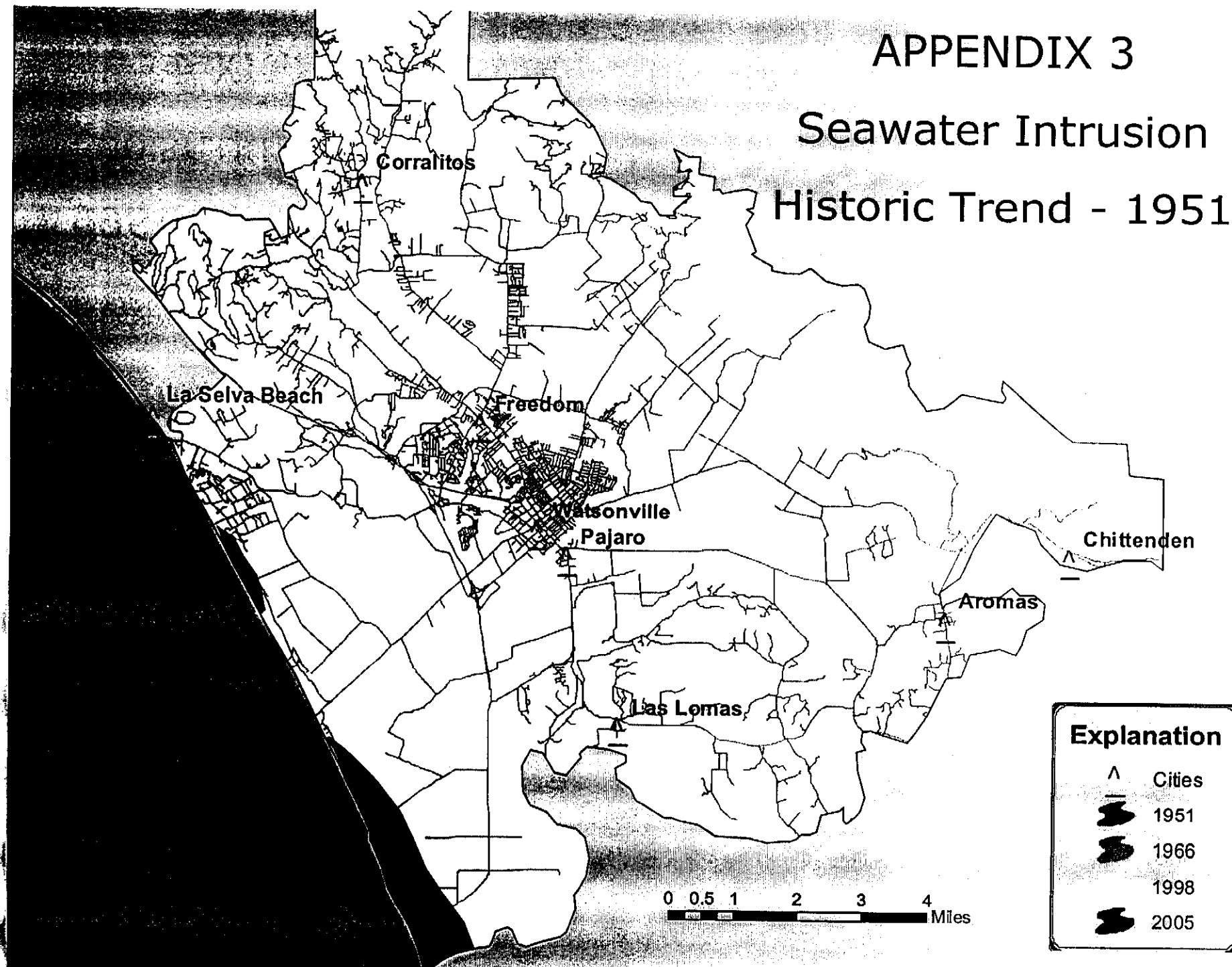
Voice: (858) 637-6839
Fax: (858) 637-9201
California District activities web site
<http://ca.water.usgs.gov/>

PVWMA Dedicated Monitoring Well L



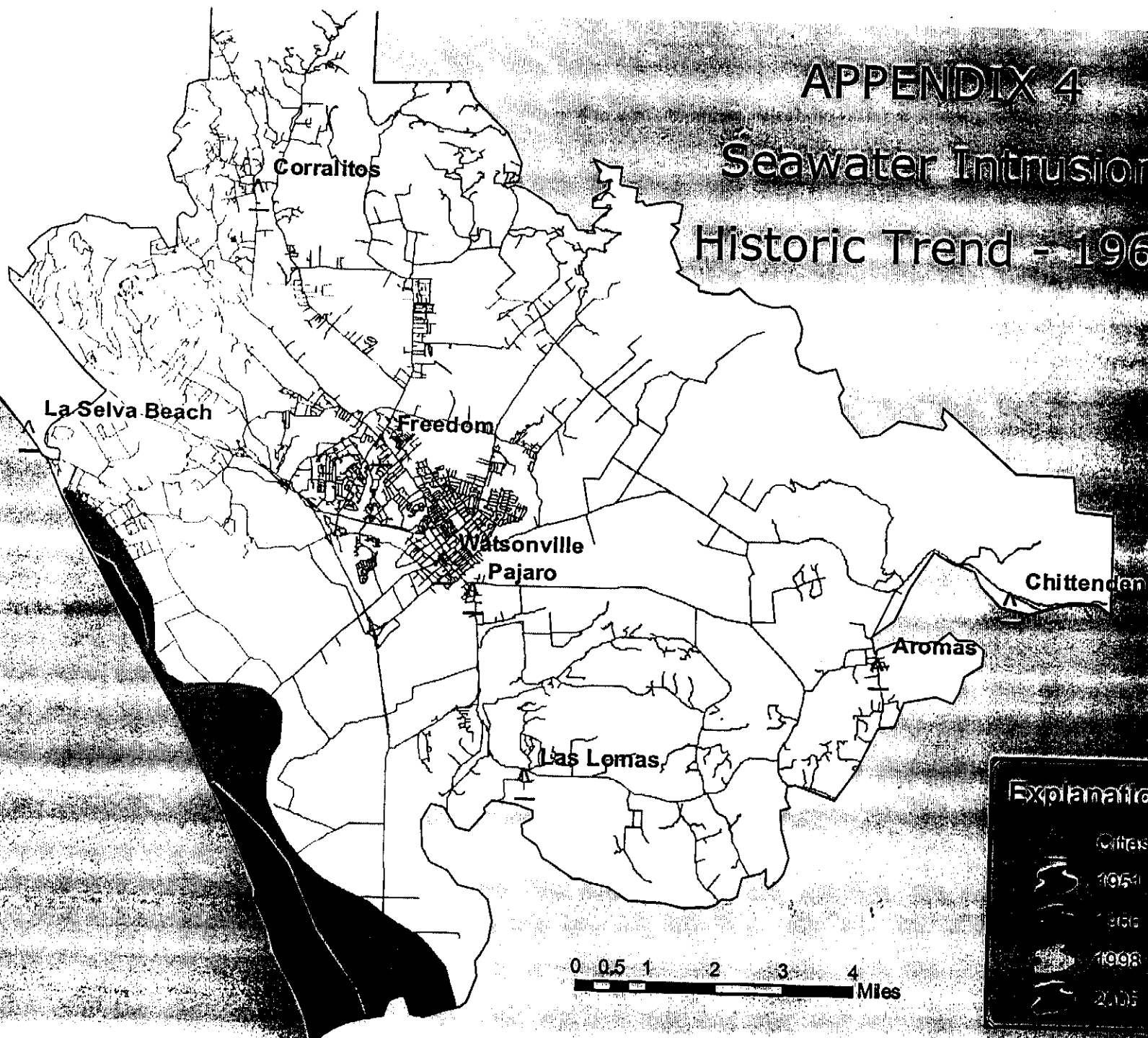
APPENDIX 3

Seawater Intrusion Historic Trend - 1951



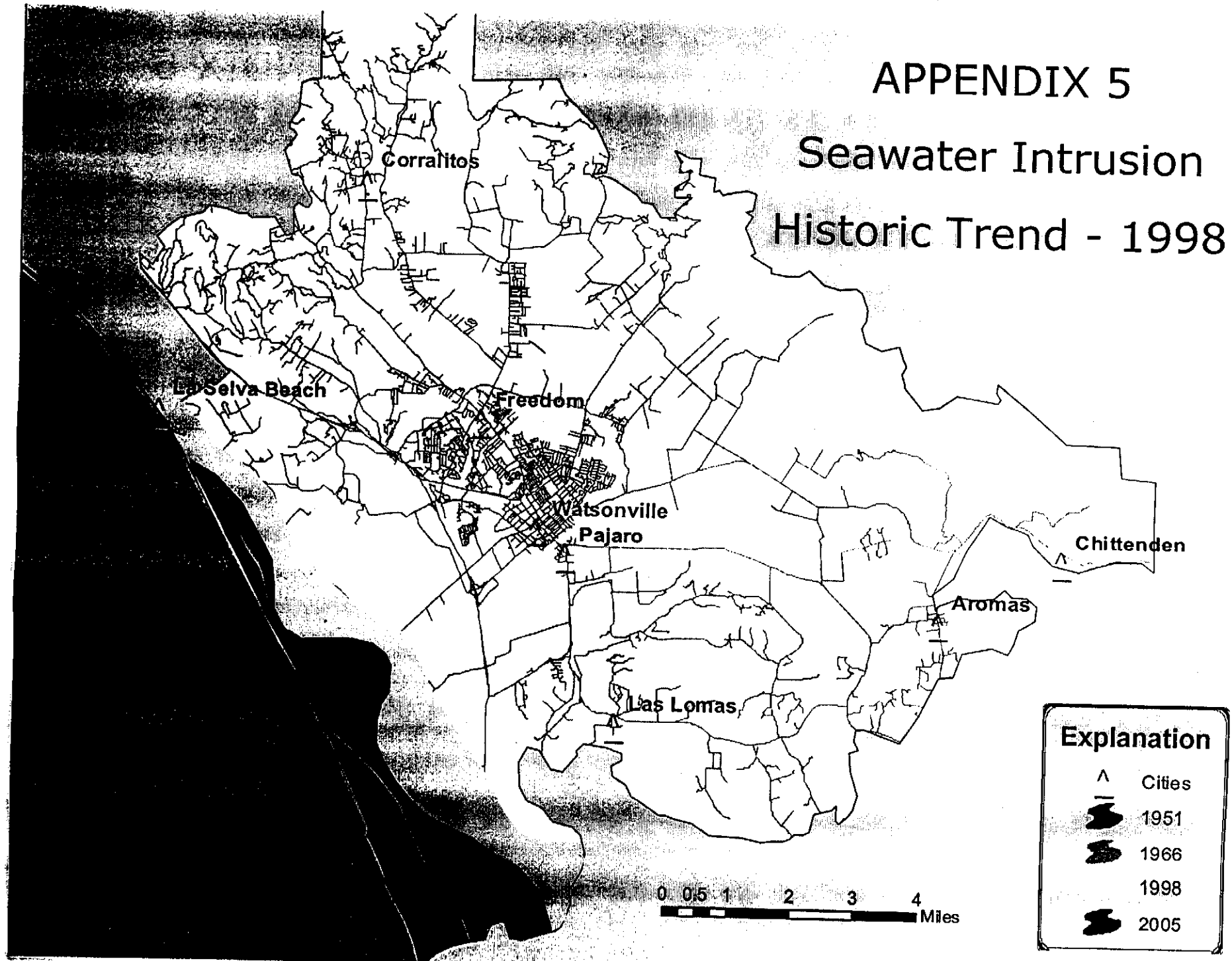
APPENDIX 4

Seawater Intrusion Historic Trend - 1966



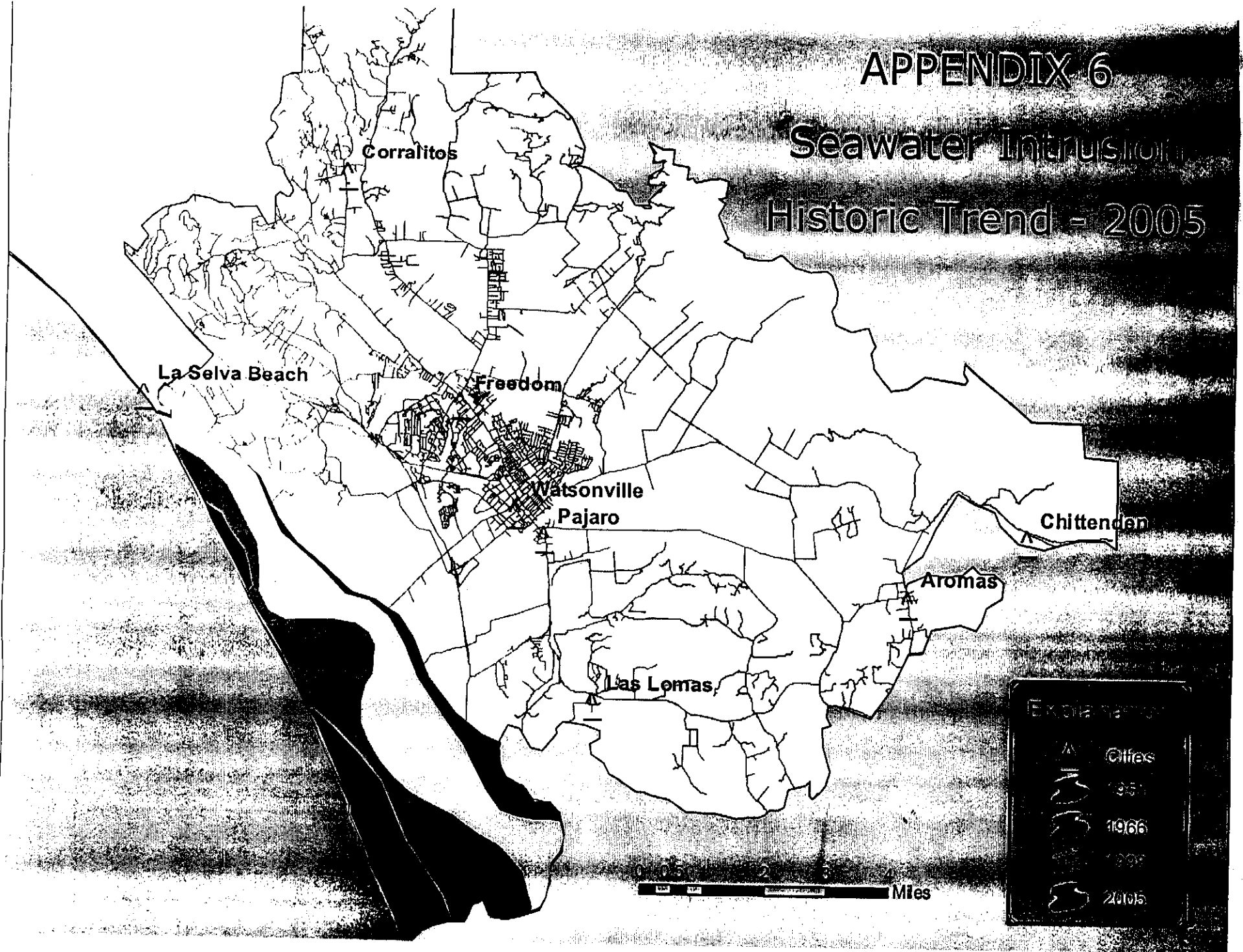
APPENDIX 5

Seawater Intrusion Historic Trend - 1998



APPENDIX 6

Seawater Intrusion Historic Trend - 2005



STAFF REPORT APPENDIX 7

RECYCLED WATER FACILITY TREATMENT PROCESSES

Evaluation of secondary effluent water quality data demonstrated the need for a tertiary treatment process to reduce effluent turbidity levels to enable disinfection to reduce bacteria to less than 2.2 MPN/100 mL. The chosen processes are Coagulation-Flocculation-Sedimentation (CFS).

The Supplier considered two CFS processes for this project. Validation testing of both units occurred in August and September 2004 (the peak food processing season) to determine the degree of treatment provided. A competitive preselection process identified the Desadeg process as having the most benefits for the Recycling Project.

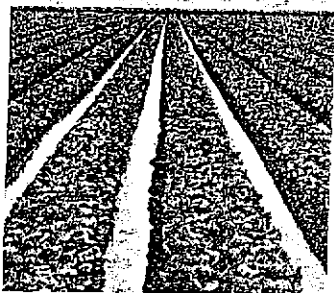
The chosen process routes the secondary effluent through a rapid-mix chamber for high-energy mixing of the coagulant and the coagulant aid into the wastewater. The next tank, the reactor chamber, mixes the secondary effluent with a polymer and sludge that has been recirculated from the settling tank. The mixture then flows into the settling tank where the coagulated and flocculated solids settle to the bottom while the clear water rises through a set of tubes into effluent channels for conveyance to the filtration process.

In 2004, the Supplier tested a pilot filtration unit at the WWTF during the peak food processing season. The pilot tests results established the need for a CFS process upstream of the filters and identified design criteria for chemical dosage and filter loading rates. The pilot tests demonstrated that cloth media filters (preceded by the chosen CFS) could filter solids from the wastewater and meet the Title 22 standards. The California Department of Public Health (CDPH) approved the chosen filtration process for Title 22 water reclamation installations.

The Supplier chose to disinfect clarified secondary effluent via an ultraviolet (UV) disinfection system. The UV channel will contain the number of lamps necessary to provide the required UV exposure to treat the Recycling Plant's flows, with one additional bank of lamps available as standby. A future channel will be constructed but is not planned to be equipped with banks at this time. Channel water depth will be set by effluent weirs that divert disinfected recycled water into an effluent basin for conveyance to the recycled water distribution pump station.

The Supplier designed the UV disinfection system according to the *Ultraviolet Disinfection Guidelines for Drinking Water and Water Reuse (2003)*, and according to designs developed from the CDPH-approved research on reclaimed water disinfection system design.

On-Farm Nitrogen Determination in Plant Sap, Soil, and Water



Monterey County
Water Resources
Agency



Santa Clara Valley
Water District



Pajaro Valley
Water Management
Agency

Plant Sap N Determination

Procedure

1. Sample a minimum of 20 plants from each field or management unit. See the chart below for the plant part to sample for each crop type. Always sample during the same time of day (preferably between 8 a.m. and 2 p.m.) to minimize variability.

Crop	Plant Part
Broccoli	Whole petioles (leaf stem) of youngest fully expanded leaf
Brussels Sprouts	Mid-rib of youngest fully expanded leaf
Cabbage	Mid-rib of wrapper leaf
Cauliflower	Mid-rib of youngest fully expanded leaf
Celery	Portion below first node of recently expanded leaf
Lettuce	Mid-rib of youngest fully expanded leaf
Spinach	Petiole of youngest mature leaf
Onion	Roots (washed with water and hand dried)

2. Avoid moisture loss from the tissue samples by keeping them in plastic bags on ice until analysis. Samples can be stored on ice for 6-8 hours without significantly affecting nitrate concentration.
3. Extract the sap from the selected plant part using a garlic press or plant press. Use the same amount of pressure to extract the sap from each of the 20 samples into a clean container. Mix and allow the sap to come to room temperature before analyzing.
4. A Cadmus® nitrate meter or Merck Reflectoquant® Analysis System can be used to analyze the sap. Follow the respective meter directions for analysis. Samples may need to be diluted with distilled water if the nitrate concentration exceeds the testing capacity of the meter.

Plant Sap N Determination

Soil NO₃-N "Quick Test" Protocol

Interpretation

The test strips measure the parts per million (ppm) nitrate (NO₃) in the solution. To approximate conversion of the reading to ppm nitrate-nitrogen (NO₃-N) for dry soil requires a correction factor based on soil texture and moisture.

$$\text{test strip reading (ppm NO}_3\text{)} \div \text{correction factor} = \text{ppm NO}_3\text{-N in dry soil}$$

Correction Factor		
Soil Texture	Moist Soil	Dry Soil
Sand	2.3	2.5
Loam	2.0	2.4
Clay	1.7	2.2

Levels less than 10 ppm NO₃-N would be considered low; levels above 20 ppm NO₃-N are adequate to meet immediate crop needs. Caution: Low soil NO₃-N levels late in the cropping season may not indicate insufficient N, rather they may indicate highly efficient crop uptake. Use plant tissue testing to confirm low N status.

Water N Determination

Procedure

1. Dip a Merckoquant® nitrate test strip into the water for one second, shake off excess solution and wait 60 seconds. Estimate nitrate concentration using the color chart provided. (Note: concentrations can vary throughout the season.)

$$\text{Strip reading (ppm NO}_3\text{)} \div 4.43 = \text{ppm NO}_3\text{-N}$$

$$\text{ppm NO}_3\text{-N} \times 1 \text{ inch} \times 0.227 = \text{lbs of NO}_3\text{-N per acre-inch of water applied}$$

A Merck RQflex® meter can be used to obtain more accurate color interpretations. Follow the meter instructions.

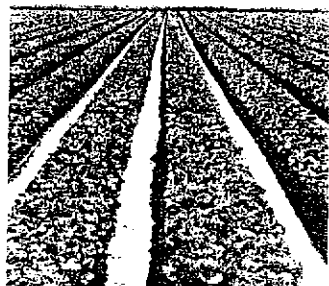
nitrogen

Conversion Table for Nitrate in Irrigation Water			
Nitrate (NO ₃ -N) ppm	Nitrate (NO ₃) ppm	lb N/acre-inch	lb N/acre-foot
N (NO ₃ -N)	NO ₃ = N x 4.43	lbs N/ac-in = N x 0.23	lbs N/ac-ft = N x 2.71
10	44	2	27
20	89	5	54
30	133	7	81
40	177	9	108
50	221	11	136
60	266	14	163
70	310	16	190
80	354	18	217
90	398	20	244
100	443	23	271
120	531	27	323
140	620	32	380
160	708	36	434
180	797	41	488
200	885	45	542
225	997	52	610
250	1107	56	678

The USEPA drinking water maximum contaminant level (MCL) for NO₃-N is 10 ppm; the MCL for NO₃ is 45 ppm.

Remember to take into account the efficiency of your irrigation system when crediting irrigation water N.

Using the Nitrate Present in Soil and Water in Your Fertilizer Calculations



Monterey County
Water Resources
Agency



Santa Clara Valley
Water District



Pajaro Valley
Water Management
Agency



▼ 3. Percent Nitrogen

▲ 4. N Requirements

La información que se presenta en este Guía de Bolsillo tiene como propósito ayudar a los agricultores a reducir la cantidad de fertilizantes nitrogenados en sus aplicaciones. Cuando las pruebas de agua de riego o de los suelos resultan "altas en nitratos," no significa necesariamente que contienen suficiente nitrógeno como para eliminar las fertilizaciones nitrogenadas adicionales. Sin embargo, siguiendo las recomendaciones que se presentan en este Guía de Bolsillo, los agricultores pueden reponer porciones de sus aplicaciones normales de fertilizantes utilizando los datos de nitrógeno-nitrato que se sabe están presentes de antemano en sus suelos o aguas.

Monterey County Water Resources Agency



Agencia de Recursos del Agua del Condado de Monterey Administra, protege y mejora la cantidad y calidad del agua y provee servicios específicos en el control de inundaciones para las generaciones presentes y futuras del Condado de Monterey.

893 Blanco Circle
Salinas, California 93901
(831) 755-4860
<http://www.mcwra.co.monterey.ca.us>

Santa Clara Valley Water District



Distrito de Riego de Valle de Santa Clara Es la agencia administrativa de las fuentes de agua que satisface las necesidades de protección contra inundaciones y las del uso de agua disponible para los 1.7 millones de residentes del Condado de Santa Clara.

5750 Almaden Expressway
San Jose, California 95118
(408) 265-2600
<http://www.scvwd.dst.ca.us>



Pajaro Valley Water Management Agency

La oficina local, instituida por el estado, responsable por la administración efectiva y eficiente de los recursos hídricos en la cuenca costera de Pajaro Valley.

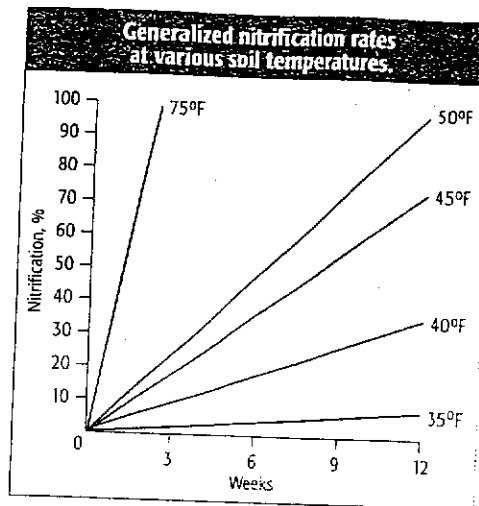
36 Brennan Street
Watsonville, CA 95076
(831) 722-9292
<http://www.pvwma.dst.ca.us>



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1. N Availability

- Nitrate is the form of nitrogen used in a crop's growth cycle.
- Nitrogen that starts as urea or ammonia must go through a conversion to nitrate before it is available to the crop.
- Hydrolysis converts urea to ammonia in 3-5 days.
hy-dro-ly-sis \hī-drā-lə-sās\ *n*: a chemical decomposition involving the addition of the elements of water.
- Nitrification converts ammonia to nitrate at a rate that depends on soil temperature (graph).
ni-tri-fi-ca-tion \nī-trə-fə-kā-shən\ *n*: the oxidation (as by bacteria) of ammonium salt to nitrite and then to nitrate.



All of the nitrate-nitrogen present in the soil or water is in a usable form; there are no inhibitors to plant uptake.

- ▲ 1. N Availability
- ▲ 2. Conversion Factors
- ▲ 3. Percent Nitrogen
- ▲ 4. N Requirements
- ▲ 5. Nit Irrigation Water
- ▲ 6. Sample Calculations

2. Conversion Factors

Conversion Factors In Water:

1 gallon of water	weighs	8.333 lbs
1 cu. ft. of water	equals	7.481 gallons

<i>When You Know</i>	<i>Multiply By</i>	<i>To Find</i>
acre-inches	27,150	gallons
acre-feet	325,850	gallons

<i>When You Know</i>	<i>Divide By</i>	<i>To Find</i>
gallons	27,150	acre-inches
gallons	325,850	acre-feet

<i>When You Know</i>	<i>Multiply By</i>	<i>To Find</i>
ppm NO ₃	0.226	ppm NO ₃ -N
ppm NO ₃ -N	4.43	ppm NO ₃

Conversion Factors In Soil:

<i>When You Know</i>	<i>Multiply By</i>	<i>To Find</i>
ppm NO ₃ -N	2	lbs N/acre (6" sample)
ppm NO ₃ -N	4	lbs N/acre (12" sample)
ppm NO ₃	0.452	lbs N/acre (6" sample)
ppm NO ₃	0.904	lbs N/acre (12" sample)

Equivalents:

1 mg/L	equals	1 ppm
1 unit N	equals	1 lb N/acre

3. Percent Nitrogen

Percent Nitrogen Forms in Standard Nitrogen Solutions ¹					
	Nitrate	Ammonia	Urea	lbs N/gal ¹	lbs/gal ²
CAN-17	11.6	5.4		2.15	12.60
AN-20	10.0	10.0		2.10	10.50
UREA-20			20.0	1.87	9.33
UAN-28	7.0	7.0	14.0	2.98	10.66
UAN-32	7.8	7.8	16.4	3.54	11.06

¹pounds of N per gallon of solution at 60°F

²material weight of solution at 60°F

¹Western Fertilizer Handbook: Eighth Edition. California Fertilizer Association.

4. N Requirements

Nitrogen Fertilizer Requirements of Cool-Season Vegetable Crops Grown Under California Conditions ¹				
Crop	Approximate Nitrogen Requirements (lbs/acre-week)			
Broccoli ¹	Early Growth 5-15 ²	Mid Season 10-20	Button Formation 15-30	Head Development 10-20
Cabbage	Early Growth 5	Mid Season 35	Curling 40	Heading 55
Celery	Early Growth 5	Mid Season 15	Late Season 25	
Garlic	Early Growth 5	Mid Season 10	Bulbing 15	
Lettuce ¹	Early Growth 5-10	Cupping 10-20	Head Filling 15-30	
Onion	Early Growth 5	Mid Season 15	Bulbing 10	

¹ Values were determined when fertilizer was added through the drip irrigation system, and should serve as a general guide, with fertilizer additions being subject to soil/tissue $\text{NO}_3\text{-N}$ levels.

² Higher values represent N needs in low residual N soils and/or under rapid growth (high temperature) conditions.

³ *Production Guide: Nitrogen and Water Management for Coastal Cool-Season Vegetables*, 1998. C.S. Pettygrove, S.R. Gratton, B.R. Hanson, T.K. Hartz, L.E. Jackson, T.R. Lockhart, K.F. Schulbach, and R. Smith. Publication 21581, Division of Agriculture and Natural Resources, University of California, Oakland, CA. This publication can be ordered from ANR Communication Services at 800-994-8849 or on the Internet at <http://commserv.ucdavis.edu/ucce/>.

5. N in Irrigation Water

Conversion Table for Nitrate in Irrigation Water			
Nitrate (NO ₃ -N) ppm	Nitrate (NO ₃) ppm	lbs N/acre-inch	lbs N/acre-foot
N (NO ₃ -N)	NO ₃ = N x 4.43	lbs N/ac-in = N x 0.23	lbs N/ac-ft = N x 2.71
10	44	2	27
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100	443	23	271
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140	620	32	380
160	708	36	434
180	797	41	488
200	885	45	542
225	997	52	610
250	1107	56	678

The USEPA drinking water maximum contaminant level (MCL) for NO₃-N is 10 ppm; the MCL for NO₃ is 45 ppm.

Remember to take into account the efficiency of your irrigation system when crediting irrigation water N.

6. Sample Calculations

Conversion Factors in Soil:

- An analysis of a soil sample from the top 12 inches indicates that there are 5 mg/L $\text{NO}_3\text{-N}$. Using the conversion factors on page 2, multiply $\text{NO}_3\text{-N}$ by 4 to get lbs N/acre (12" sample)
- Therefore, there are 20 lbs N/acre in the top 12 inches of soil, potentially available to the crop.

Conversion Factors in Water:

- An analysis on a water sample indicates that your irrigation water contains 100 mg/L NO_3 .
 - ① $\text{mg/L NO}_3 \times 0.226 = \text{mg/L NO}_3\text{-N}$ (page 2)
 $100 \times 0.226 = 22.6 \text{ mg/L NO}_3\text{-N}$
 - ② $\text{mg/L NO}_3\text{-N} \times 0.23 = \text{lbs N/ac-in}$ (page 5)
 $22.6 \times 0.23 = 5.2 \text{ lbs N/ac-in}$
- Therefore, for every inch of irrigation water applied, 5.2 lbs of potentially useable nitrogen is applied. If your irrigation system's distribution uniformity is 70%, then you can count on 5.2×0.70 lbs-N/ac-in or 3.6 lbs of N for every inch of water applied.

Nitrogen in Standard Fertilizer Solutions:

- After taking into account how much nitrogen is already in the soil at the crop's active root zone, and how much N is being applied in each irrigation, let's say you determine that you need an additional 20 lbs N/acre. Use the table on page 3 to determine how much CAN17 fertilizer, for example, is required to supply the desired amount.

$$\text{① } \% \text{Nitrate} + \% \text{Ammonia} + \% \text{Urea} = \% \text{N in product}$$

$$11.6 + 5.4 + 0 = 17\% \text{ N in CAN17}$$

$$\text{② } \text{lbs-N/ac} + \% \text{N} = \text{lbs of product per acre}$$

$$20 + 0.17 = 117.65 \text{ lbs of CAN17 per acre}$$

OR

$$\text{③ } \text{lbs-N/ac} + \text{lbs-N/gal} = \text{gallons product per acre}$$

$$20 + 2.15 = 9.30 \text{ gallons of CAN17 per acre}$$

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION
895 Aerovista Place, Suite 101
San Luis Obispo, CA 93401-7906**

**MASTER RECLAMATION PERMIT
ORDER NO. R3-2008-0039**

(Waste Discharger Identification No. 3 440308181)

FOR

**CITY OF WATSONVILLE, SUPPLIER OF RECYCLED WATER AND
PÁJARO VALLEY WATER MANAGEMENT AGENCY, DISTRIBUTOR OF
RECYCLED WATER
SANTA CRUZ COUNTY**

The California Regional Water Quality Control Board, Central Coast Region (hereafter Water Board), finds that:

1. **Basin Plan.** On November 19, 1989, the Water Board adopted the Water Quality Control Plan, Central Coast Basin (Basin Plan), and approved by the State Water Resources Control Board (State Board) on August 16, 1990. The Water Board approved amendments to the Basin Plan on February 11, 1994, and September 8, 1994. The Basin Plan incorporates statewide plans and policies by reference and contains a strategy for protecting beneficial uses of State Waters. This Permit implements the Basin Plan.
2. **Beneficial Uses.** The Basin Plan designates the existing and anticipated beneficial uses of groundwater in the vicinity of the recycled water use areas as follows:
 - a. Municipal and Domestic Water Supply (MUN); and
 - b. Agricultural Water Supply (AGR).
3. The Basin Plan's Section II.A.4. (Objectives for Groundwater) provides both narrative and numeric groundwater quality objectives (WQO) for the protection of MUN and AGR beneficial uses. The narrative WQOs identify the Maximum Contaminant Levels (MCLs) for drinking water supply provided in California Code of Regulations (CCR), Title 22, Division 4, Chapter 15 as the numerical WQOs. The recommended secondary MCL for TDS in drinking water is 500 mg/L while 1,000 mg/L shall not be exceeded.

The Basin Plan states that "ground waters shall not contain concentrations of chemical constituents in amounts that adversely affect beneficial uses" and provides that "interpretation of adverse effect shall be as derived from the California Agricultural Extension Service guidelines provided in Table 3-3" on page III-14 of the Basin Plan.

For example, Table 3-3 provides that irrigation water containing chloride in excess of 142 mg/L may cause increasing problems to crops and/or soils.

4. **Excessive pumping and seawater intrusion.** Decades of pumping to irrigate farmlands and to supply urban areas in the Pájaro Valley has overdrafted groundwater supplies. The pumping has lowered groundwater levels year-round to below sea level, which has allowed seawater to flow inland and supplant fresh groundwater near the shoreline. Seawater intruding into aquifers near Monterey Bay has contaminated a number of irrigation supply wells.
5. **Groundwater quality degradation.** The Distributor has completed five monitoring well clusters in the recycled water use areas. Each cluster contains three wells to monitor the shallow, middle and deeper water bearing zones for potential pollutants and water table elevations. Monitoring results demonstrate substantial increases in concentrations of seawater constituents, including chloride and Total Dissolved Solids (TDS). Concentrations of chloride, TDS, and other pollutants in groundwater often exceed water quality objectives, sometimes greatly.
6. **Beneficial use impairment.** Seawater intrusion has impaired the beneficial uses of groundwaters in water-bearing zones underlying farmlands and urban areas in the Pájaro Valley near Monterey Bay. Municipal and domestic supply (MUN) and agricultural supply (AGR) are the impaired beneficial uses of the groundwaters. The impairment has limited the supply of fresh groundwater needed to sustain the long-term agricultural and urban economy of the Pájaro Valley.
7. **Remedy for impairment.** The City of Watsonville (the Supplier) and the Pájaro Valley Water Management Agency (the Distributor) are jointly implementing the Watsonville Area Water Recycling Project (Recycling Project). The Supplier will operate a Recycled Water Facility (Recycling Plant) to produce disinfected tertiary recycled water for the Distributor to send through the Coastal Distribution System (Distribution System) to irrigate farmland near the coast, instead of pumping from the local aquifers. Nearshore groundwater levels should subsequently rise and should then begin to prevent seawater intrusion into the nearshore aquifers.
8. California Water Code (CWC) Section 13576(e) states that the use of recycled water has proven to be safe from a public health standpoint.
9. The Distributor developed the Recycling Project in the 2002 Revised Basin Management Plan, which evaluated alternative approaches to (1) gradually reduce and finally eliminate seawater intrusion and (2) balance water extractions and recharge in the groundwater basin. The chosen project combines water conservation and water supply development, which would ultimately produce 4,000 acre feet per year (AFY) of recycled water, 1,100 AFY from the local Harkins Slough project, up to 1,400 AFY of local groundwater and 1,600 AFY of the City of Watsonville's potable water.

10. An assessment of urban, agricultural, environmental enhancement, and groundwater recharge water recycling opportunities described in the August 2004 *Recycling Project Feasibility Study* demonstrated that agricultural irrigation in the coastal portion of the Pájaro Valley is the best opportunity for the use of recycled water. The Feasibility Study investigated the water quality goals provided by the agricultural users and identified water quality objectives for agricultural irrigation.
11. **Secondary-treated wastewater.** The Supplier owns and operates a Wastewater Treatment Facility (WWTF) at 401 Panabaker Lane in Watsonville, California, next to the Pájaro River, as shown on Attachment A. The Supplier treats municipal wastewater collected from approximately 61,000 people living in a 21 square mile service area, which includes the City, the Freedom County Sanitation District, the Pájaro County Sanitation District, and the Salsipuedes Sanitary District.
12. The WWTF's treatment processes include screening, pre-aeration/grit removal, primary sedimentation, biological tower trickling filters, solids contact stabilization (activated sludge), and secondary clarification.
13. The WWTF's design secondary wastewater treatment capacity is 12.0 million gallons per day (mgd) average dry weather flow and 38.2 mgd peak wet weather flow. The Supplier treats municipal wastewater to secondary standards and discharges the effluent into Monterey Bay through a 7,350 foot outfall/diffuser system. In 2007, flow through the WWTF averaged 6.20 mgd.
14. **Disinfected tertiary treated recycled water.** To comply with treatment standards in CCR, Title 22, Division 4, Chapter 3, Article 3, §60304(a), the Supplier proposes to treat secondary effluent from the WWTF to tertiary standards in the new Recycling Plant. The Recycling Plant's treatment processes include coagulation-flocculation-sedimentation, cloth media filtration, and ultraviolet disinfection.
15. The Recycling Plant's design capacity is 7.7 mgd, and will produce up to 7.0 mgd of recycled water to provide 4,000 AFY to the Distributor. Future plant improvements will increase production to 11.6 mgd.
16. **Distribution for irrigation.** The Distributor will provide recycled water to agricultural users to irrigate up to 238 properties on 9,500 acres through the Distribution System, which comprises 31 miles of pipeline. The recycled water use areas primarily overlie alluvial soils consisting of sands, gravels, and clays. The Aromas Sands, the main water-bearing zone, underlies the alluvial deposits. The maximum flow through the Distribution System will be 50,000 gallons per minute (gpm). Attachment A depicts the use areas and the Distribution System.
17. **Recycled water limitations.** This Permit establishes recycled water limitations that require the Distributor to blend freshwater with the recycled water to reduce pollutants to levels that ensure the irrigation water complies with the Basin Plan's water quality objectives, including TDS, nitrate, and chloride.

18. **Engineering report.** In September 2007, in accordance with CCR Title 22, Division 4, Chapter 3, Article 7, § 60323, the Supplier and Distributor submitted the final Title 22 Engineering Report for the Recycling Project to the Water Board's Executive Officer. A properly qualified engineer registered in California and experienced in wastewater treatment systems prepared the Engineering Report in accordance with the California's Department of Public Health's (DPH) March 2001 *Guidelines for the Preparation of an Engineering Report for the Production, Distribution and Use of Recycled Water*. The Engineering Report clearly describes the means to comply with the Title 22 Water Recycling Criteria (CCR Title 22, Division 4, Chapter 3) and includes a contingency plan, which will ensure that the Supplier and Distributor will deliver no untreated or inadequately-treated wastewater to the use areas. Attachment B provides the Recycling Plant process flow chart.
19. With comments, DPH approved the Engineering Report on February 25, 2008. The Supplier and Distributor will respond to the comments before distributing recycled water to the use areas.
20. **Report of Waste Discharge.** The Supplier and Distributor submitted a report of waste discharge for the Recycling Plant on April 1, 2008.
21. **Master reclamation permit.** In accordance with CWC §13523.1 and other CWC and CCR Title 22 sections, this Master Reclamation Permit specifies water recycling requirements, waste discharge requirements, and water reclamation requirements to ensure the Supplier produces and the Distributor uses the recycled water in a manner protective of the public's health and the beneficial uses of groundwaters and surface waters. The Board has consulted with DPH regarding the regulation of this discharge.
22. **Water User's Handbook.** To ensure that recycled water users comply with this Master Reclamation Permit (Permit), the Distributor developed and adopted Rules and Regulations and the Water User's Handbook. The Distributor incorporated the Rules and Regulations into the Water User's Handbook.
23. **Surface waters beneficial uses.** The Pájaro Estuary and the Watsonville Slough and its tributaries are the surface waters nearest the use areas. The Basin Plan designates existing and anticipated beneficial uses as follows:
 - a. Water Contact Recreation;
 - b. Non-Contact Water Recreation;
 - c. Wildlife Habitat;
 - d. Cold Freshwater Habitat;
 - e. Warm Freshwater Habitat;
 - f. Migration of Aquatic Organisms; and

- g. Commercial and Sport Fishing.
24. The Basin Plan also designates the shellfish harvesting beneficial use for the Pájaro River Estuary.
25. Compliance with the Permit will protect the beneficial uses of the Pájaro estuary and Watsonville Slough and its tributaries.
26. **Antidegradation policy.** Changes in groundwater and surface water quality resulting from irrigation of farmlands as authorized by this Permit's waste discharge requirements will not violate the provisions of State Water Resources Control Board Resolution No. 68-16, *Statement of Policy with Respect to Maintaining the High Quality of Waters in California*.
27. **TMDL.** Clean Water Act (CWA) §303(d) requires states to identify and list water bodies that do not meet water quality standards for specific pollutants and to establish Total Maximum Daily Loads (TMDL) for listed water bodies.
28. The Pájaro River's 303(d) listed pollutants include sediment, nitrate, and fecal coliform. The sediment TMDL received final approval on November 27, 2006, and the nitrate TMDL on November 13, 2006. Water Board staff are developing the fecal coliform TMDL for the Pájaro River. The Watsonville Slough TMDL for pathogens received final approval on November 20, 2006, and the pesticide TMDL is in development.
29. In accordance with the February 24, 2004, State Water Resources Control Board memorandum discussing the incidental runoff of recycled water, potential pollutants in the recycled water will not likely contribute significantly to the pollutant loads in the surface waters mentioned above because only incidental runoff of irrigation water will occur.
30. **Monitoring and Reporting Program.** Attached Monitoring and Reporting Program (MRP) No. R3-2008-0039 is part of the Permit. The MRP requires routine monitoring to verify compliance with the Permit and to protect the beneficial uses of nearby surface waters and groundwaters underlying the use areas.
31. **CEQA.** These waste discharge requirements are an action to maintain, restore, enhance or protect the natural environment and are exempt from the provisions of the California Environmental Quality Act (Public Resources Code, Section 21000, et seq.) in accordance with CCR Title 14, Chapter 3, §15308.
32. **Stormwater.** The Supplier will route stormwater at the Recycling Plant to the WWTF's headworks for treatment. Therefore, the Supplier need not enroll under the State Water Resources Control Board's General Industrial Activities Storm Water Permit.

33. **Conditional Waiver for Irrigated Lands.** The *Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands* requires all commercial irrigated farming operations in the Central Coast Region to prepare Farm Water Quality Management Plans. Accordingly, the Distributor manages a Nitrate Management Program (NMP), which helps farmers use the recycled water's nitrogen to optimize its application to crop needs. The NMP complies with the requirements of the agricultural waiver program.
34. A permit and the privilege to discharge waste into waters of the State are conditional upon the discharge complying with provisions of Division 7 of the California Water Code and of the Clean Water Act (as amended or as supplemented by implementing guidelines and regulations) and with any more stringent effluent limitations necessary to implement water quality control plans, protect beneficial uses, and prevent nuisance. Compliance with this Permit should ensure conditions are met and mitigate any potential changes in water quality due to the project.
35. On **April 11, 2008**, the Board notified the Supplier, Distributor, and other interested parties of its intent to prescribe water reclamation requirements for the Facility and associated reuse areas. In addition, the Water Board provided them with an opportunity for a public hearing and to submit their written views and recommendations.
36. The Board, at a public meeting held July 11, 2008, heard and considered all comments pertaining to the discharge and found this Order consistent with the above findings.
37. Any person affected by this action of the Board may petition the State Water Board to review the action in accordance with Section 13320 of the California Water Code and Title 23 of the California Code of Regulations, Section 2050. The State Water Board must receive the petition within 30 days of the date of this Order. Copies of the law and regulations applicable to filing petitions will be provided upon request.

IT IS HEREBY ORDERED, pursuant to authority in Sections 13263 and 13523.1 of the California Water Code that Supplier, its agents, successors, and assigns, may produce reclaimed wastewater from the Recycled Water Facility for distribution by the Distributor, and that Distributor, its agents, successors, and assigns, may distribute reclaimed wastewater for irrigation providing they comply with the following:

The following footnotes provide the sources of requirements. Unless otherwise noted, BPJ is the source of requirements without footnotes. Footnotes are as follows:

- 40CFR Title 40 Code of Federal Regulations
BP Water Quality Control Plan, Central Coast Region
DPH California DPH
T22 CCR Title 22, Division 4, Chapter 3: Water Recycling Criteria

CWC	California Water Code
SWRCB	State Water Resources Control Board memorandum
ER	Engineering Report
ROWD	The Supplier and Distributor's Report of Waste Discharge
RWU	Guidelines for Use of Reclaimed Wastewater for Irrigation and Impoundment, California DPH
BPJ	Best Professional Judgment of Water Board Staff

A. PROHIBITIONS

1. The treatment, storage, distribution, or reuse of recycled water shall not create a nuisance as defined in section 13050(m) of the California Water Code.^{CWC}
2. No recycled water used for irrigation shall be applied during periods of rainfall or when soils are saturated such that runoff occurs.^{CWC}
3. Recycled water shall be confined to use areas of authorized storage and use with no discharge to surface waters or drainages.^{CWC}
4. No recycled water shall be discharged from the treatment facilities other than for designated irrigation or other approved reuse applications in accordance with this Permit.^{CWC}
5. The incidental discharge of recycled water to waters of the State shall not unreasonably affect the beneficial uses of the water, and not result in an exceedance of an applicable water quality objective in the receiving water.^{SWRCB}
6. There shall be no cross-connections between the potable water supply and pipes containing recycled water. Supplementing recycled water with water used for domestic supply shall not be allowed except through an air-gap separation. In accordance with CCR Title 17, §7604, a reduced pressure principle backflow device shall be provided at premises where recycled water is used and there is no interconnection with the potable water system.^{T22}

B. SPECIFICATIONS

1. The Supplier and Distributor shall produce and distribute recycled water according to the following guidelines:
 - a. *Guidelines for Use of Reclaimed Wastewater for Irrigation and Impoundment, California DPH;*
 - b. *Guidelines for Worker Protection at Reclamation Use Areas,*
 - c. *Guidelines for the Distribution of Non-potable Water, American Water Works Association, California-Nevada Section (AWWA);*
 - d. *Guidelines for On-site Retrofit of Facilities Using Disinfected Tertiary Recycled Water (AWWA);*

- e. *Manual of Cross-Connection Control, Procedures and Practices*, DPH;
 - f. *Guidelines for the Use of Reclaimed Water*, DPH;
 - g. *Drinking Water Supplies - Backflow Prevention*, CCR Title 17, and
 - h. The Distributor's approved reclaimed water use rules and regulations.^{BPJ}
2. Personnel involved in producing, transporting, or using recycled water shall be informed of possible health hazards that may result from contact and use of recycled water.^{T22}
3. Personnel involved in inspecting, maintaining or operating any distribution system equipment for recycled water shall be informed of the possible health hazards that may result from contact and use of recycled water.^{T22}
4. Delivery and application of recycled water shall cease during any period the Facility fails to produce "disinfected tertiary recycled water" meeting CCR Title 22 criteria. The delivery of recycled water shall not be resumed until all conditions which caused the limits to be violated have been corrected and effluent in the storage ponds is suitable for disinfected tertiary recycled water applications.^{T22}
5. Spray irrigation of recycled water shall be accomplished at a time and in a manner to minimize ponding and the possibility of public contact with sprayed materials.^{RWU}
6. All recycled water use areas with public access shall be posted (in English and Spanish) to warn the public not to drink the recycled water.^{ER}
7. Recycled water systems shall be properly labeled and regularly inspected to ensure proper operation, absence of leaks, and absence of illegal connections.^{T22}
8. The Supplier and Distributor shall maintain in good working order and operate as efficiently as possible any facility or control system installed by the Supplier, Distributor or Users to achieve compliance with this Order and all applicable water reclamation requirements.^{RWU}
9. The Supplier and Distributor shall implement, and ensure that Users implement, annual employee training to ensure proper operation of reclamation facilities, worker protection, and compliance with this Order.^{RWU}
10. The Supplier and Distributor shall ensure that all above-ground equipment, including pumps, piping, storage reservoir, and valves, etc. under their respective control which may at any time contain reclaimed water shall be adequately and clearly identified with warning signs. The Supplier and Distributor shall make all necessary provisions to inform the public that the water being stored or distributed is reclaimed municipal wastewater and is unfit for human consumption. The Supplier and Distributor shall ensure that each User complies with these requirements for all above-ground equipment under a User's control.^{RWU}

C. SUPPLIER REQUIREMENTS

I. Flow and WWTF Effluent Limitations

1. Monthly average influent wastewater flow volumes shall not exceed 7.2 mgd. ^{ER}
2. The WWTF effluent shall not exceed the following effluent limitations:

WWTF Effluent Limitations (mg/L)			
Parameter	Daily Max	30- Day Mean	7-Day Mean
BOD ₅	--	10	25
Total Suspended Solids	--	10	25

3. The effluent pH shall not be less than 6.5 or greater than 8.4. ^{BP}

II. Recycled Water Requirements ^{T22}

4. The Supplier shall ensure that recycled water shall be adequately oxidized, filtered, and disinfected.
5. The turbidity of the disinfected tertiary recycled water shall not exceed any of the following:
 - a. An average of 2 NTU within a 24-hour period;
 - b. 5 NTU more than 5 percent of the time within a 24-hour period; and
 - c. 10 NTU at any time.
6. The recycled water from the Recycling Plant shall not contain total coliform concentrations exceeding the following:
 - a. the seven-day median concentration must not exceed an MPN of 2.2/100 milliliters (mL);
 - b. concentrations must not exceed 23/100 mL in more than one sample taken over a 30-day range; and
 - c. concentrations must be less than 240/100 mL at all times.
7. There shall be no bypass of untreated or partially treated wastewater from the reclamation plant or any intermediate unit processes to the point of use.

III. Reclamation Facility Operational Requirements

The Supplier shall:

8. Install alarm devices required for various unit processes as specified in other sections of these regulations to provide warning of:
 - a. Loss of power from the normal power supply.
 - b. Failure of a biological treatment process.
 - c. Failure of a disinfection process.
 - d. Failure of a coagulation process.
 - e. Failure of a filtration process.
 - f. Any other specific process failure for which warning is required by the regulatory agency.^{T22}.

All required alarm devices shall be independent of the normal power supply of the Facility.

The person to be warned shall be the plant operator, superintendent, or any other responsible person designated by the management of the reclamation plant and capable of taking prompt corrective action.^{T22}.

Individual alarm devices may be connected to a master alarm to sound at a location where it can be conveniently observed by the attendant. In case the reclamation plant is not attended full time, the alarm(s) shall be connected to sound at a police station, fire station or other full-time service unit with which arrangements have been made to alert the person in charge at times that the reclamation plant is unattended.^{T22}

9. Provide one of the following reliability features for the power supply:
 - a. Alarm and standby power source,
 - b. Alarm and automatically actuated short-term retention or disposal provisions, or
 - c. Automatically actuated long-term storage or disposal.^{T22}.
10. Ensure the design of process piping, equipment arrangement, and unit structures in the reclamation plant must allow for efficiency and convenience in operation and maintenance and provide flexibility of operation to permit the highest possible degree of treatment to be obtained under varying circumstances.^{T22}.
11. Provide the Recycling Plant with a sufficient number of qualified personnel to operate the facility to always achieve the required treatment level.^{T22}.
12. Ensure the qualified personnel shall be those meeting requirements established pursuant to Chapter 9 (commencing with Section 13625) of the Water Code.^{T22}.
13. Provide a preventive maintenance program at the Recycling Plant to ensure that all equipment is kept in a reliable operating condition.^{T22}.
14. Maintain operating records at the Recycling Plant or a central depository. These shall include all analyses specified in the reclamation criteria; records of

operational problems, plant and equipment breakdowns; and diversions to emergency storage or disposal; and all corrective or preventive action taken. ^{T22}.

15. Record, and maintain as a separate record file, process or equipment failures triggering an alarm. The recorded information shall include the time and cause of failure and corrective action taken. ^{T22}.
16. A monthly summary of operating records as specified in these requirements shall be filed with the regulatory agency.
17. Immediately report any discharge of untreated or partially treated wastewater to the use area, and the cessation of same, by telephone to the Executive Officer, the State Department of Health, and the local health officer at the numbers provided in the Monitoring and Reporting Requirements. ^{T22}
18. Implement a Contingency Plan, including but not necessarily limited to, the provisions in the Engineering Report's section 2.9, to prevent inadequately-treated recycled water from distribution to the Distribution System. ^{ER}

D. DISTRIBUTOR/USER REQUIREMENTS

I. Recycled water limitations^{BP}

The Distributor shall ensure compliance with the following:

1. Before distributing the recycled water to use areas, the recycled water shall comply with the following limitations:

RECYCLED WATER LIMITATIONS	
Pollutant	Limitation, mg/L, 30-day average
Nitrate as nitrogen	10
Total dissolved solids	500
Chloride	140

2. Recycled water shall be applied in an amount that will not cause nitrogen within the root zone to exceed the agronomic demand for nitrogen and result in the leaching of nitrate to groundwater. Hydraulic and nutrient loading rates for the application of disinfected tertiary recycled water shall be based on crop consumption and tolerance and shall not exceed what is reasonable for crop production.

II. Coastal Distribution System Use Area Requirements^{T22}

The Distributor shall ensure compliance with the following requirements:

1. No irrigation with recycled water shall occur within 50 feet of a potable water supply well unless all of the following conditions have been met:
 - a. A geological investigation demonstrates that an aquitard exists at the well between the uppermost aquifer being drawn from and the ground surface,
 - b. The well contains an annular seal that extends from the surface into the aquitard,
 - c. The well is housed to prevent any recycled water spray from coming into contact with the wellhead facilities,
 - d. The ground surface immediately around the wellhead is contoured to allow surface water to drain away from the well, and
 - e. The owner of the well approves of the elimination of the buffer zone requirement.
2. No impoundment of disinfected tertiary recycled water shall occur within 100 feet of any domestic water supply well.
3. Use of recycled water shall comply with the following:
 - a. Irrigation runoff shall be confined to the recycled water use area;
 - b. Spray, mist, or runoff shall not enter dwellings, designated outdoor eating areas, or food handling facilities;
 - c. Drinking water fountains shall be protected against contact with recycled water spray, mist, or runoff.
4. Except as allowed in CCR Title 17, §7604, no physical connection shall be made or allowed to exist between a recycled water system and a separate system conveying potable water.
5. Quick couplers different from those used on the potable water system, instead of hose bibbs, shall be installed on recycled water system piping in publicly accessible areas.
6. Backflow prevention devices shall be in prime working order, as shown by initial and annual testing. The Distributor shall maintain records of testing and maintenance.
7. The public water supply shall not be used as a backup or supplemental source of water for a dual-plumbed recycled water system unless the connection between the two systems is protected by an air gap separation which complies with the requirements of sections 7602(a) and 7603(a) of title 17, California Code of Regulations, and the approval of the public water system has been obtained.

III. Groundwater Limitations

8. The application of disinfected tertiary recycled water shall not cause groundwater to contain taste- or odor-producing substances in concentrations that adversely affect beneficial uses. ^{BP}
9. To protect the MUN beneficial use of groundwater underlying the use areas, the application of disinfected tertiary treated water shall not cause groundwater to: ^{BP, T22}
 - a. Exceed the Primary Maximum Contaminant Levels (MCLs) for organic chemicals set forth in CCR Title 22, Division 4, Chapter 15, Article 5.5, §64444.
 - b. Exceed the Primary MCLs for inorganic chemicals set forth in CCR Title 22, Division 4, Chapter 15, Article 4, §64431.
 - c. Exceed the levels for radionuclides set forth in CCR Title 22, Division 4, Chapter 15, Article 5, §64443.
10. The application of disinfected tertiary recycled water shall not cause radionuclides to be present in groundwater in concentrations that are deleterious to human, plant, animal, or aquatic life, or result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life. ^{BP}

IV. Groundwater Monitoring Well Work Plan^{BPJ}

11. **By September 1, 2008**, the Distributor shall submit a work plan for the Executive Officer's review and approval. The workplan's goal shall be to ensure the groundwater monitoring well network is adequate to evaluate the effect on groundwater quality, if any, of the application of recycled water in the reuse areas.

The Distributor shall ensure the workplan is prepared by a registered professional engineer or geologist with experience in monitoring well network design, monitoring well construction, and groundwater hydrology. The workplan shall include a record of the workplan preparer's experience.

The workplan shall address, but not necessarily be limited to, the following:

- a. The condition of existing monitoring wells in the reuse areas with regard to the ability to obtain groundwater samples representative of the waters in the water-bearing formations. To that end, the workplan should provide for consideration of the level of siltation in the filter pack around the screened intervals, condition of the casing and screen, the pump and all other well features, and other relevant factors.
- b. The need for additional monitoring wells to adequately monitor the effects of the irrigation water on the quality of groundwaters underlying the reuse areas.
- c. The workplan shall provide adequate numbers of monitoring wells to allow implementation of the Nitrate Management Plan
- d. The workplan shall provide for the complete installation of new monitoring wells and/or rehabilitation of existing monitoring wells in a timely manner, but **no later than March 31, 2009**.

V. Nitrate Management Plan^{BPJ}

12. The Distributor shall prepare and implement a nitrate management plan (Nitrate Plan) for the application of recycled water. The Nitrate Plan's goal shall be to ensure the recycled water applied to farmlands does not further degrade the quality of underlying groundwaters. The Distributor shall submit the Nitrate Plan for the approval of the Executive Officer by **September 1, 2008**.
13. The Distributor shall ensure the Nitrate Plan is prepared by professionals with expertise in nitrate management, nitrate uptake by crops in recycled water use areas, and other relevant factors. The Distributor shall attach a record of the preparer's experience to the Nitrate Plan.
14. The Nitrate Plan shall account for nitrate discharges to application areas in both recycled water and fertilizers, and shall limit the amount of applied nitrogen to ensure it does not exceed that required by the crops for their optimum growth.
15. **Water User's Handbook.** By **September 1, 2008**, the Distributor shall submit, for the approval of the Executive Officer, the final Water User's Handbook. The Water User's Handbook shall include the Rules and Regulations adopted by the Distributor.^{CWC}
16. **Site Supervisor.** The Distributor and Supplier shall require each User to designate a Reclaimed Water Site Supervisor responsible for compliance with permit conditions and answerable to the Distributor and immediately notify the Distributor of changes in the Reclaimed Water Site Supervisor and provide documentation that the new supervisor has received training.^{BPJ}
17. **Use permits.** Recycled Water Use permits, issued by the Distributor in accordance with the approved rules and regulations, are the basis of permitted recycled water use by specific Users. Recycled Water Use permits shall specify self-monitoring and reporting requirements for each User, and require compliance with all applicable requirements of this Permit. The Distributor must provide a copy of the Recycled Water Use permit and this Permit to the Users. Recycled Water Use permits shall require Users to have these available at all times for inspection by Water Board staff, the Distributor, or State/County Health Officers.^{BPJ}
18. If someone other than the Distributor or User is responsible for applying the recycled water, then the Distributor shall inform the secondary distributor of these requirements in a written permit or other suitable manner. In addition, the secondary distributor shall fill out a Recycled Water Release Form when receiving reclaimed water from the Distributor. The secondary distributors must carry the Recycled Water Release Form at all times.^{BPJ}

E. PROVISIONS

1. The Supplier and Distributor shall comply with all applicable requirements of Monitoring and Reporting Program No. R3-2008-0039. The Distributor shall collect required data and reports from the Supplier and Users. The Distributor shall require each User to train a Recycled Water Supervisor and to submit on-site observation reports and use data to the Distributor, who will compile and file self-monitoring reports with the Water Board. The Distributor, at its discretion, may appoint and train the Users' Recycled Water Supervisors, and collect on-site observation reports and use data.
2. The Supplier shall document that reclaimed water meets the quality standards of this Permit. The Distributor shall be responsible for regulating the design, construction, maintenance and operation of recycled water transport facilities, application areas and associated appurtenances owned and operated by the Users and for ensuring that Users meet all water application, operations and maintenance requirements of this Permit. The Distributor shall conduct periodic inspections of User facilities and conduct monitoring and reporting to document compliance with the conditions of the Users' permits and this Permit.
3. The Supplier, Distributor and Users shall allow the Board or its authorized representative in accordance with CWC§ 13267(c):
 - a. Entry upon premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of the Permit,
 - b. Access to and copy of any records that must be kept under conditions of this Permit,
 - c. Inspection of any facility, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Permit,
 - d. To photograph, sample, and monitor for the purpose of assuring compliance with this Permit.
5. The Supplier and Distributor shall comply with all applicable items of the attached "Standard Provisions and Reporting Requirements for Waste Discharge Requirements", dated January 1984. The Board will revise this Permit periodically and may revise these requirements when necessary.
6. The State Department of Public Health is currently revising the Title 22 regulations for water reuse. When revised regulations are finalized, the Executive Officer may authorize changes to the restricted and unrestricted recycled water uses consistent with those regulations. ^{DHS}
7. Pursuant to CCR, Title 23, Division 3, Chapter 9, the Discharger shall submit a report to the Executive Officer not later than July 11, 2013 addressing:
 - a. Whether there will be changes in the continuity, character, location, or volume of the discharge; and,

- b. Whether, in their opinion, there is any portion of the Permit that is incorrect, obsolete, or otherwise in need of revision.

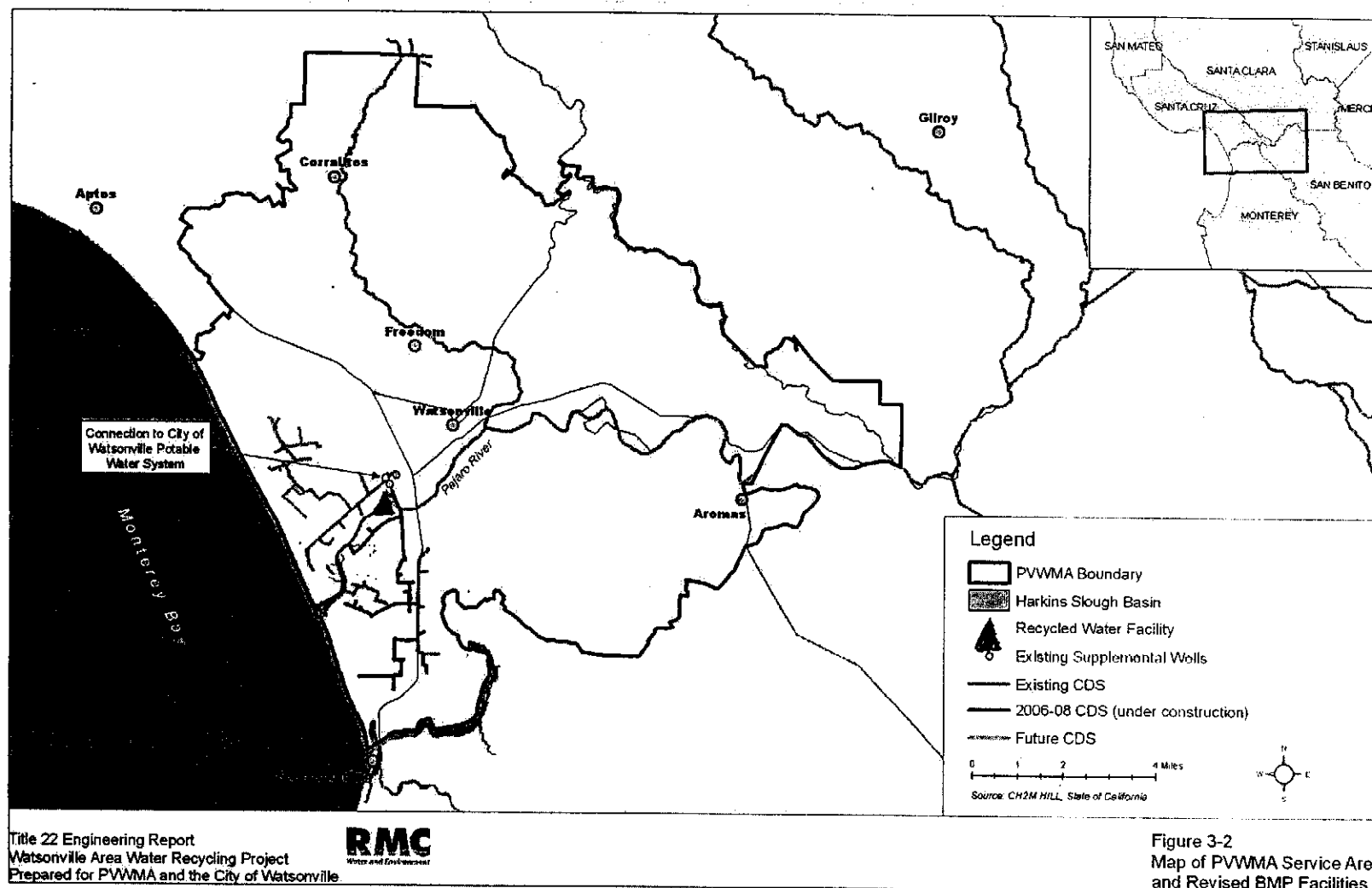
I, **ROGER W. BRIGGS, Executive Officer**, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Coast Region, on July 11, 2008.

Ordered By:

Executive Officer

S:\WDRWDR Facilities\Santa Cruz Co\Pajaro
Valley Water Management Agency\WRP R3-
2008-0039\WR Permit R3-2008-0039.doc

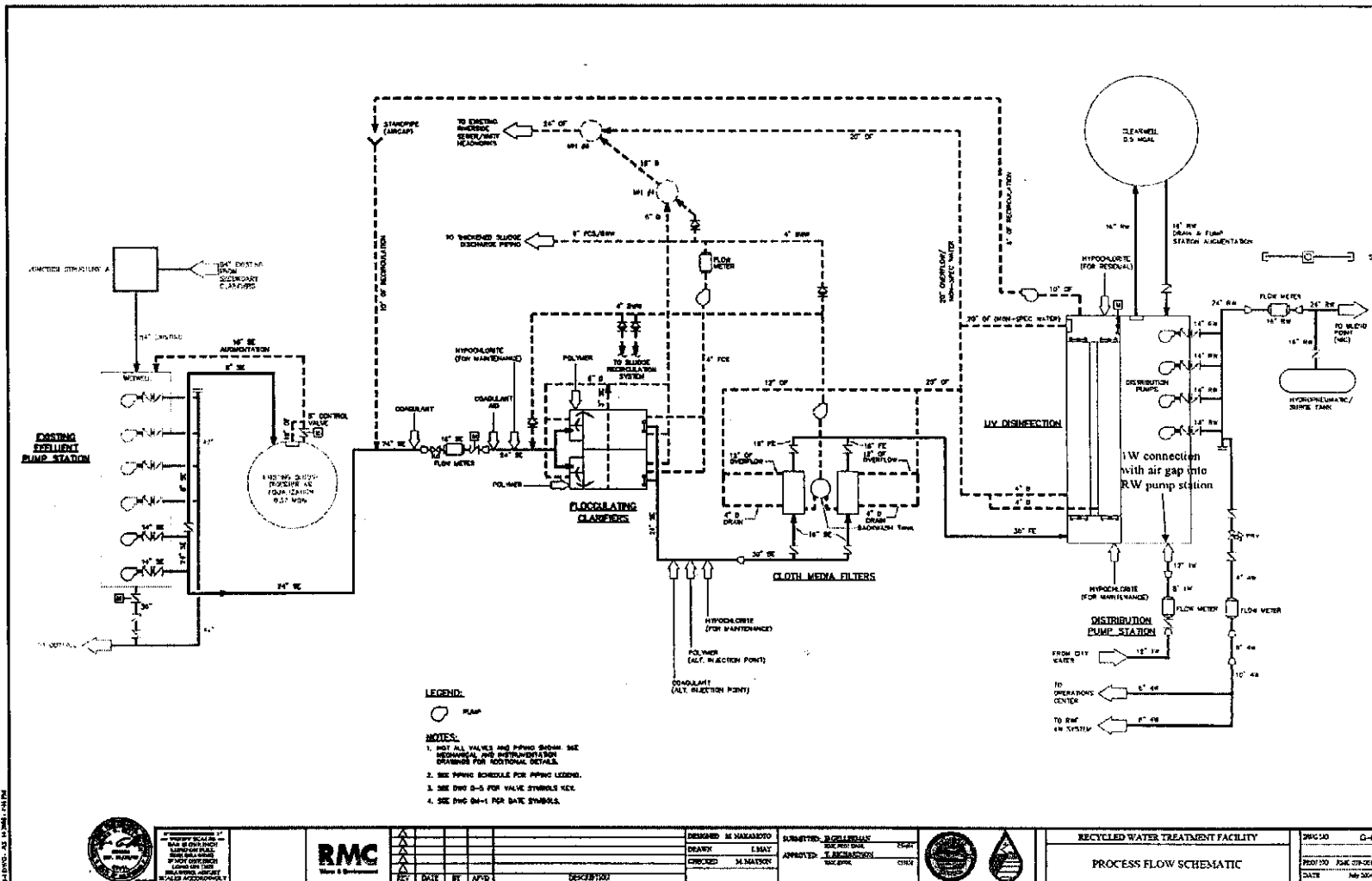
Figure 3-2: Map of PVPVWMA Service Area and Revised BMP Facilities



Title 22 Engineering Report
 Watsonville Area Water Recycling Project
 Prepared for PVPVWMA and the City of Watsonville



Figure 2-2: RWF Process Flow Schematic



ATTACHMENT B

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION
895 Aerovista Place, Suite 101
San Luis Obispo, CA 93401-7906**

**SUPPLIER AND DISTRIBUTOR
MONITORING AND REPORTING PROGRAM NO. R3-2008-0039**

FOR

**CITY OF WATSONVILLE WATER RECYCLING FACILITY (SUPPLIER) AND
PAJARO VALLEY WATER MANAGEMENT AGENCY COASTAL DISTRIBUTION
SYSTEM (DISTRIBUTOR),
SANTA CRUZ COUNTY**

SUPPLIER REQUIREMENTS

A. RECYCLED WATER FACILITY INFLUENT MONITORING

1. The Supplier shall take representative samples of the wastewater treatment facility effluent supplied to the recycled water facility and shall analyze the samples for the constituents/parameters at the frequencies in Table 1:

TABLE 1			
Constituent/Parameter ^a	Units	Sample Type ^b	Sampling Frequency
Daily Flow Volume	gal/day	Metered	Continuous
Min Daily Flow	gal/day	Calculated	Monthly
Max Daily Flow	gal/day	Calculated	Monthly
Average Daily Flow	gal/day	Calculated	Monthly
pH	Units	Grab	Weekly
BOD ₅	mg/L	24-hour composite	Monthly
Total Suspended Solids	mg/L	24-hour composite	Monthly
Total Nitrogen (as N)	mg/L	24-hour composite	Monthly
Nitrate nitrogen (as N)	mg/L	24-hour composite	Monthly
Total Dissolved Solids	mg/L	24-hour composite	Semiannually ^c
Sodium	mg/L	24-hour composite	Semiannually ^c
Chloride	mg/L	24-hour composite	Semiannually ^c
Sulfate	mg/L	24-hour composite	Semiannually ^c
Boron	mg/L	24-hour composite	Semiannually ^c

- a) After one year, the Supplier may request to discontinue sampling for specific parameters/constituents.
- b) Composite samples shall be flow weighted. 24-hour composite samples shall be collected on a Monday through Sunday rotating schedule and subsequent monthly sampling events shall be separated by at least 16 days and no greater than 30 days.
- c) Semiannual monitoring shall be conducted in January and July.

B. RECYCLED WATER MONITORING

1. The Supplier shall take representative samples of disinfected tertiary-treated recycled water, when it is supplied to the Distributor, and shall analyze the samples for the following constituents/parameters and at the following frequencies:

Table 2			
Constituent/Parameter^a	Units	Sample Type	Sampling Frequency
Daily Flow	mgd	Metered	Continuous
Turbidity	NTU	Metered	Continuous
Total Coliform	MPN/100 ml	Grab	Daily
BOD ₅	mg/L	Grab	Weekly ^b
Total Suspended Solids	mg/L	Grab	Weekly ^b
Total Nitrogen (as N)	mg/L	Grab	Monthly ^b
Nitrate (as N)	mg/L	Grab	Monthly ^b
Ammonia (as N)	mg/L	Grab	Monthly ^b
pH	Units	Grab	Weekly ^b
Total Dissolved Solids	mg/L	Grab	Monthly ^b
Sodium	mg/L	Grab	Monthly ^b
Chloride	mg/L	Grab	Monthly ^b
Sulfate	mg/L	Grab	Monthly ^b
Boron	mg/L	Grab	Monthly ^b

- a) Sampling shall occur immediately after the final treatment process.
- b) Weekly and monthly samples shall be collected on a Monday through Sunday rotating schedule. Subsequent monthly sampling events shall be separated by at least 16 days and no greater than 30 days.

C. SUPPLIER REPORTING

1. If the Supplier implements the Contingency Plan (Supplier Requirement No. C , -III, 18), the Supplier shall immediately notify the following agencies:

Central Coast Water Board (805) 549-3147
Pájaro Valley Water Management Agency (831) 722-9292
Santa Cruz County Environmental Health Services (831) 454-2022

The Supplier shall submit a written report to the Executive Officer, Santa Cruz County Environmental Health Services, and the Distributor within five (5) days of the time the Supplier learns of the violation.

The written report shall contain a description of the non-compliance and its cause; the period of non-compliance, including dates and times, and if the non-compliance has not been corrected, the anticipated time it is expected to

continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the non-compliance.

2. The Supplier shall submit **Quarterly** monitoring reports to the Central Coast Water Board by the first of the second month following the end of each quarter as follows:

Table 3	
Monitoring Period	Report Submittal Date
January 1 – March 31	May 1 st
April 1 – June 30	August 1 st
July 1 – September 30	November 1 st
October 1 – December 31	February 1 st

3. The monitoring reports shall contain all data collected or calculated over the previous quarterly monitoring period. All monitoring data shall be tabulated in a logical and coherent format and be accompanied by copies of laboratory analytical data sheets as applicable. The data shall be summarized in a manner that clearly illustrates compliance with the Permit and Title 22 requirements for disinfected tertiary recycled water.
4. **By January 30th of each year**, the Supplier shall submit to the Central Coast Water Board an annual monitoring report pursuant to Standard Provisions and Reporting Requirements, General Reporting Requirement C.16.

The annual reports shall also include the following:

- a. A complete electronic copy of the previous years data in a Microsoft Excel spreadsheet format;
 - b. A copy of the most recent Contingency Plan, or a statement certifying the plan has been reviewed but not updated during the previous year with reference to the date of the current plan.
5. If the Supplier monitors any pollutant more frequently than is required by this Monitoring and Reporting Program, the results of such monitoring shall be included in the monitoring reports.

DISTRIBUTOR REQUIREMENTS

D. RECYCLED WATER USE AREA MONITORING

1. **Weekly**, the Distributor shall record the quantity of reclaimed water distributed to each reuse site.
2. **Weekly**, during periods of recycled water application the Distributor or Users, as applicable, shall inspect the irrigation use areas to verify and document compliance with Order No R3-2008-0039. The visual inspections shall be noted in a bound inspection logbook(s) and at a minimum shall document proper

sprinkler operation, runoff, erosion, saturated surface conditions, and odors. The logbook(s) shall be provided to the Water Board upon request. A summary of observations made during water recycling area inspections and a brief discussion of any corrective actions taken or planned shall be included with each annual monitoring report.

3. **Annually**, the Distributor and Users shall ensure and document that backflow devices are present, tested by a certified person, and repaired or replaced if found defective.
4. **At least quarterly**, the Distributor shall inspect and document the operation of the reuse site irrigation systems to verify that the Users are operating the reuse sites in compliance with Order No. R3-2008-0039.
6. **Annually**, if necessary, the Distributor shall perform and document a cross-connection test by an appropriately certified person on an annual basis at each reuse site where both recycled water and potable water piping systems are utilized for irrigation or are otherwise in proximity to each other. Cross-connection tests will not be required for portions of the distribution system or reuse site areas for which no distribution system or potable water system maintenance, modifications, or additions have occurred since the last cross-connection test. The Distributor shall provide a certified statement as such for portions of the distribution system or reuse sites not tested for potential cross-connection.
5. **Quarterly**, each individual User Recycled Water Site Supervisor shall provide updates to the Distributor regarding irrigation frequency and flow rates, proposed system modifications, system peculiarities, and to verify employee training. The Distributor shall keep a record of system modifications and document that all work is conducted in accordance with the Cross Connection Control Plan and applicable regulations.
6. The Distributor shall compile and conduct quarterly reviews of the applied recycled water flows to identify unusual usage behavior or significant changes. The Distributor shall conduct and document follow-up investigations if patterns change dramatically.

E. GROUNDWATER MONITORING

1. The Distributor shall obtain representative samples of groundwater from monitoring wells in PV1 through PV8 and all newly installed monitoring wells. Samples of groundwater shall be obtained in accordance with Table 4.

Table 4			
Constituent/Parameter ^{a, b, c}	Units	Sample Type	Sampling Frequency ^d
Depth to Water	Feet	Measured	Quarterly
Total Nitrogen (as N)	mg/L	Grab	Quarterly
Nitrate (as N)	mg/L	Grab	Quarterly

Table 4			
Constituent/Parameter ^{a, b, c}	Units	Sample Type	Sampling Frequency ^d
pH	Units	Grab	Quarterly
Total Dissolved Solids	mg/L	Grab	Quarterly
Sodium	mg/L	Grab	Quarterly
Chloride	mg/L	Grab	Quarterly
Sulfate	mg/L	Grab	Quarterly
Boron	mg/L	Grab	Quarterly

- a) Sampling for specific analytes or from specific monitoring wells may be reduced or discontinued after one year upon Discharger request and Executive Officer approval for parameters/constituents for which additional data provides no benefit.
- b) Provide well construction details for each monitoring well, as follows: total well depth, screened interval, top of well casing elevation, and groundwater elevations.
- c) The Executive Officer may request geologic and hydrogeologic information to evaluate if the monitoring well network is adequate.
- d) After the first year, the Discharger may request the Executive Officer approve less frequent sampling.

F. REPORTING

1. The Distributor shall submit **Quarterly** monitoring reports summarizing reclaimed water use at each reuse site and shall including a list of the reuse sites with the name, location and brief description of each reuse site, the total amount of reclaimed water supplied to each reuse site, and the name of the hydrologic areas underlying each reuse site.

The Quarterly monitoring reports shall be submitted by the first of the second month following the end of each quarter as follows:

Table 5	
Monitoring Period	Report Submittal Date
January 1 – March 31	May 1 st
April 1 – June 30	August 1 st
July 1 – September 30	November 1 st
October 1 – December 31	February 1 st

2. The Distributor shall submit **annual** reports by March 1st of each year summarizing reclaimed water use, including the total volume of reclaimed water supplied, and the total number of reclaimed use sites and their locations. Reports shall include records of the Distributor's or User's reuse site inspections and results of the annual cross-connection tests. Annual monitoring reports shall contain at a minimum:

- a. Documentation of the use area and groundwater monitoring requirements listed above;
 - b. A list of Users accompanied by a scaled map showing the recycled water use areas;
 - c. A table summarizing monthly recycled water application rates in acre-feet and gallons for each recycled water use area; and
 - d. The Nitrate Management Plan report;
3. The monitoring reports shall contain all data collected or calculated over the previous annual monitoring period. All monitoring data shall be tabulated in a logical and coherent format and be accompanied by copies of laboratory analytical data sheets as applicable. The data shall be summarized in a manner that clearly illustrates compliance with the Permit. The User list, use area map, and recycled water application summary table shall be cross-referenced for easy evaluation.
4. The Distributor shall report any adverse conditions or non-compliance with Order No. R3-2008-0039 potentially endangering public health or the environment to the Water Board (805/549-3147), Santa Cruz County Environmental Health Services (831/454-2022), and other agencies as appropriate within 24 hours of learning of the conditions. A summary record of all adverse conditions or non-compliance along with corrective actions taken shall be included in each annual monitoring report.

Depending on the severity of the reported adverse condition or non-compliance, a written report may also be required by the Water Board. The written report shall be required within five days of the initial informal reporting date and shall contain a description of the non-compliance and its cause; the period of non-compliance, including dates and times, and if the non-compliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent future non-compliance.

5. **Nitrate Management Plan (Nitrate Plan) Reporting.** The Distributor shall submit an annual report of allowable, as determined by the Nitrate Plan, and actual nitrate loading to the recycled water application areas. The report shall include, at a minimum:
 - a. Quantities of nitrate from recycled water and fertilizer applied to the use areas and the groundwater basin overall;
 - b. Comparison of the allowable nitrate and hydraulic contribution to the actual contributions;
 - c. Nitrate concentrations in groundwater;
 - d. Evaluation of potential adverse effects of nitrate loading on the groundwater basin, if any; and,
 - e. Recommendations and time schedules for the implementation of measures addressing excessive nitrogen loading (i.e., actual loading greater than allowable loading) as applicable.

6. **Salts Reporting.** The Distributor shall submit an annual report comparing the Total Dissolved Solids (TDS), sodium, and chloride concentrations in the recycled water to the concentrations in the shallow, medium and deep zones as measured by well clusters PV1 through PV8.

SUPPLIER AND DISTRIBUTOR REQUIREMENTS

G. PROVISIONS

1. All quarterly monitoring shall be performed any time during the monitoring quarter (calendar quarter), but samples representative of two consecutive quarterly periods must be separated by at least one month. Monthly sampling shall be conducted at regularly scheduled times during each month and consecutive events should be approximately four weeks apart and no less than two weeks apart. Unless otherwise specified by the Monitoring and Reporting Program, annual sampling shall be performed any time during the calendar year, but samples representative of two consecutive annual periods must be obtained at least six months apart.
2. All analyses shall be conducted according to test procedures established at 40 CFR 136, *Guidelines Establishing Test Procedures for Analysis of Pollutants*.
3. All samples collected shall be tracked and submitted under chain of custody and analyzed by a laboratory certified by California Department of Public Health for the specified analysis.
4. The Executive Officer may revise this Monitoring and Reporting Program.
5. The Supplier and Distributor shall submit a copy of each monitoring report with a completed copy of the attached monitoring and reporting program transmittal sheet to:

California Water Quality Control Board
Central Coast Region
895 Aerovista Place, Suite 101
San Luis Obispo, CA 93401

Ordered By:

Executive Officer

Date _____

California Water Quality Control Board
Central Coast Region
Attn: Monitoring and Reporting Review Section
895 Aerovista Place, Suite 101
San Luis Obispo, CA 93401-7906

Mr. Briggs:

Facility Name

Address

Contact Person

Job Title

Phone Number

WDR/NPDES Order Number

Type of Report (circle one):

Monthly Quarterly Semi-Annual Annual

Month(s) (circle applicable months):

JAN FEB MAR APR MAY JUN

JUL AUG SEP OCT NOV DEC

Annual Reports (Circle the first month of the reporting period)

Year:

Violation(s)

____ No (there are no violations to report)
____ Yes

If 'Yes' is marked, complete a-g:

a) Parameter(s) in Violation:

b) Section(s) of WDR/NPDES Violated:

c) Reported Value(s):

d) WDR/NPDES Limit or Condition:

e) Dates of Violation(s):

(reference page of report/data sheet)

f) Explanation of Cause(s):

(attach additional information as needed)

g) Corrective Action(s):

(attach additional information as needed)

In accordance with the Standard Provisions and Reporting Requirements, I certify under penalty of law that this document and all attachments were prepared under my direction or supervision following a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my knowledge of the person(s) who manage the system, or those directly responsible for data gathering, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

If you have any questions or require additional information, please contact me at the number provided above.

Sincerely,

Name:

Title:

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION

JANUARY, 1984

STANDARD PROVISIONS AND REPORTING REQUIREMENTS
for
WASTE DISCHARGE REQUIREMENTS

CONTENTS:

- A. General Conditions
 - B. General Monitoring Requirements
 - C. General Reporting Requirements
 - D. Bypasses or Upsets
 - E. Enforcement
 - F. Definitions (Defines terms that appear in quotes)
- A. General Permit Conditions:

Prohibitions:

- 1. Introduction of "incompatible wastes" to the treatment system is prohibited. (See F.9.)
- 2. Discharge of chemical and biological warfare agents is prohibited.
- 3. Discharge of "toxic wastes" is prohibited. (See F.18.)
- 4. Introduction of pollutants into the collection, treatment, or disposal system by an "indirect discharger" that:
 - a. inhibit or disrupt the treatment process, system operation, or the eventual use or disposal of sludge; or,
 - b. cause or "significantly contribute" to a violation of any requirement of this Order, is prohibited. (See F.17.)
- 5. Introduction of "pollutant-free" wastewater to the collection, treatment, and disposal system in amounts that threaten compliance with this order is prohibited. (See F.14.)

Provisions:

- 6. Production and use of reclaimed water shall conform with reclamation criteria established in Title 22, Chapter 3, of the California Administrative Code. For uses of reclaimed water not addressed in Title 22 and not in the main body of this order, use is subject to review and dependent upon approval by the Executive Officer before use may begin (For uses addressed in Title 22, see C.8.).
- 7. Collection, treatment, and discharge of waste shall not create nuisance or pollution, as defined by Section 13050 of the California Water Code.

8. As necessary to assure safe and reliable collection, treatment, and disposal of waste and consistent compliance with this order, the discharger shall adopt and enforce a local source control program. (See C.16.)
 9. Objectionable odors originating at this facility shall not be perceivable beyond the limits of the wastewater treatment and disposal areas.
 10. The discharger shall prevent formation of a habitat for carriers of pathogenic microorganisms in any part of the treatment and disposal system.
 11. Petroleum products, grease, and scum shall not be visible on disposal ponds.
 12. Facilities and systems for collection, treatment, and control of wastewater shall be properly operated and maintained. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staff and training, and adequate laboratory and process controls, including appropriate quality assurance procedures.
 13. Transport and treatment facilities and permanent disposal ponds shall be adequately protected against overflow, flooding, or washout as the result of a 100-year frequency flood or 100-year, 24-hour storm.
 14. All disposal areas shall be on land owned or controlled by the discharger.
 15. Operation of collection, treatment, and disposal systems shall be in a manner that precludes public contact with wastewater.
 16. Collected screenings, sludges, and other solids removed from liquid wastes shall be disposed in a manner approved by the Executive Officer.
 17. Publicly owned wastewater treatment plants shall be supervised and operated by persons possessing certificates of appropriate grade pursuant to Title 23 of the California Administrative Code.
 18. The Regional Board shall be allowed:
 - a. entry upon premises where an effluent source is located or where records must be kept under the conditions of this order;
 - b. access to copy any records that must be kept under the conditions of this order;
 - c. to inspect any facility, equipment (including monitoring and control equipment), practices, or operations regulated or required under this order; and,
-

- d. to photograph, sample, and monitor for the purpose of showing compliance with this order.
19. After notice and opportunity for a hearing, this order may be terminated or modified for cause, including, but not limited to:
- a. violation of any term or condition contained in this order;
 - b. obtaining this order by misrepresentation, or by failure to disclose fully all relevant facts;
 - c. a change in any condition or endangerment to human health or environment that requires a temporary or permanent reduction or elimination of the authorized discharge; and,
 - d. a material change in character, location, or volume of the discharge.
20. This order does not authorize commission of any act causing injury to the property of another, does not convey any property rights of any sort, does not remove liability under federal, state, or local laws, and does not guarantee a capacity right.
21. The discharger shall take all reasonable steps to minimize or correct adverse impacts on the environment resulting from non-compliance with this order.
22. Provisions of this order are severable. If any provision of the order is found invalid, the remainder of the order shall not be affected.
23. The discharger shall furnish, within a reasonable time, any information the Regional Board may request to determine compliance with this order or to determine whether cause exists for modifying or terminating this order.
24. Safeguards shall be provided to assure maximal compliance with all terms and conditions of this order. Safeguards shall include preventative and contingency plans and may also include alternative power sources, stand-by generators, retention capacity, operating procedures, or other precautions. Preventative and contingency plans for controlling and minimizing the effect of accidental discharges shall:
- a. identify possible situations that could cause "upset", "overflow" or "bypass", or other noncompliance. (Loading and storage areas, power outage, waste treatment unit outage, and failure of process equipment, tanks, and pipes should be considered.)

- b. evaluate the effectiveness of present facilities and procedures and describe procedures and steps to minimize or correct any adverse environmental impact resulting from noncompliance with the order.
- 25. Physical Facilities shall be designed and constructed according to accepted engineering practice and shall be capable of full compliance with this order when properly operated and maintained. Proper operation and maintenance shall be described in an Operation and Maintenance Manual. Facilities shall be accessible during the wet-weather season.
- 26. Should additional data become available through monitoring or investigation that indicates compliance with this order is not adequately protecting ground water, the Regional Board will review and revise this order as appropriate.

B. General Monitoring Requirements:

- 1. Monitoring location, minimum sampling frequency, and sampling method for each parameter shall comply with the Monitoring and Reporting Program of this order. Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, entitled "Guidelines Establishing Test Procedures for Analysis of Pollutants," unless other test procedures have been specified in this order.
- 2. If results of monitoring a pollutant appear to violate effluent limitations based on a weekly, monthly, 30-day, or six-month period, but compliance or non-compliance cannot be validated because sampling is too infrequent, the frequency of sampling must be increased to validate the test within the next monitoring period. The increased frequency must be maintained until the Executive Officer agrees the original monitoring frequency may be resumed.

For example, if suspended solids are monitored weekly and results exceed the weekly average numerical limit in the order, monitoring of suspended solids must be increased to at least four (4) samples every week (ref. paragraph F.1.).
- 3. Water quality analyses performed in order to monitor compliance with this order shall be by a laboratory certified by the State Department of Health Services for the constituent(s) being analyzed.

If the laboratory used or proposed for use by the discharger is not certified by the California Department of Health Services due to restrictions in the State's laboratory certification program, the discharger shall be considered in compliance with this provision provided:

 - a. Data results remain consistent with results of samples analyzed by the Regional Board;

- b. A quality assurance program is used at the laboratory, including a manual containing steps followed in this program that is available for inspections by the staff of the Regional Board; and,
 - c. Certification is pursued in good faith and obtained as soon as possible after the program is reinstated.
- 4. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. Samples shall be taken during periods of peak loading conditions. Influent samples shall be samples collected from the combined flows of all incoming wastes, excluding recycled wastes. Effluent samples shall be samples collected downstream of the last treatment unit.
 - 5. If any parameter is monitored at locations specified in the order more frequently than required and is analyzed using approved test procedures, the results shall be included in calculations and reports.
 - 6. All monitoring instruments and devices used by the discharger to fulfill the prescribed monitoring program shall be properly maintained and calibrated as necessary to ensure their continued accuracy.
 - 7. The discharger shall maintain records of all monitoring information, including all calibration and maintenance records; all original strip chart recordings for continuous monitoring instrumentation; the date, exact place, and time of sampling; the individual who performed the sampling; the date analysis was performed; the laboratory and individual who performed the analysis; the analytical techniques used; and results. Records shall be maintained for a minimum of three years. This period may be extended during the course of any unresolved litigation or when requested by the Board.

C. General Reporting Requirements:

- 1. Monitoring results shall be reported at intervals and in a manner specified in the Monitoring and Reporting Program of this order.
- 2. Monitoring reports shall be submitted on State Water Resource Control Board Form Q2 or an acceptable alternate form. A master copy of the form will be supplied by the Regional Board upon request.
- 3. Any noncompliance that may endanger health or the environment shall be reported orally within 24 hours from the time the discharger becomes aware of the circumstances (telephone: 805-549-3147). Unless waived by the Executive Officer of the Regional Board, a written report shall be submitted within five (5) days of awareness and shall contain a description of the noncompliance and its cause; the period of noncompliance (including exact dates and times) or anticipated duration; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance. This provision includes, but is not limited to:

- a. violation of a discharge prohibition;
 - b. any "upset", "overflow", or "bypass";
 - c. violation of a discharge limitation for any "hazardous substance."
4. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule shall be submitted within 14 days following each scheduled date unless otherwise specified within the order. If reporting noncompliance, the report shall include a description of the reason, a description and schedule of tasks necessary to achieve compliance, and an estimated date for achieving full compliance. A second report shall be submitted within 14 days of full compliance.
 5. All instances of noncompliance not reported under paragraph numbers C.3. and C.4., above, shall be submitted along with monitoring reports. The report shall contain the information listed in paragraph C.3.
 6. Reports shall be submitted in advance of any planned changes in the permitted facility or activity that may result in noncompliance.
 7. The "discharger" shall file a report of waste discharge or secure a waiver from the Executive Officer at least 120 days before making any material change or proposed change in the character, location, or volume of the discharge.
 8. An engineering report as specified by Section 60323, Chapter 3, Title 22, of the California Administrative Code, is required, and written approval of the Executive Officer must be received by the discharger and user, before reclaimed water is supplied for any uses and to any users other than those enumerated in this Order.
 9. Within 120 days after the discharger discovers, or is notified by the Regional Board, that monthly average daily flow will or may reach design capacity of waste treatment and/or disposal facilities within four (4) years, the discharger shall file a written report with the Regional Board. The report shall include:
 - a. the best estimate of when the monthly average daily dry weather flow rate will equal or exceed design capacity; and,
 - b. a schedule for studies, design, and other steps needed to provide additional capacity for waste treatment and/or disposal facilities before the waste flow rate equals the capacity of present units.

In addition to complying with paragraphs C.14.c and C.15, the required technical report shall be prepared with public participation and reviewed, approved and jointly submitted by all planning and building departments having jurisdiction in the area served by the waste collection, treatment, or disposal facilities.

10. The "discharger" shall submit reports to the:
California Regional Water
Quality Control Board
Central Coast Region
81 Higuera St., Suite 200
San Luis Obispo, CA 93401-5427
11. Transfer of control or ownership of a waste discharge facility must be preceded by a notice to the Regional Board at least 30 days in advance of the proposed transfer date. The notice must include a written agreement between the existing discharger and proposed discharger containing specific date for transfer of responsibility, coverage, and liability between them. Whether an order may be transferred without modification and a public hearing is at the discretion of the Board. If order modification is necessary, transfer may be delayed 120 days after the Regional Board's receipt of a complete Report of Waste Discharge.
12. Except for data determined to be confidential under Section 13267 (b) of the California Water Code, all reports prepared in accordance with this order shall be available for public inspection at the office of the Regional Board.
13. Should the discharger discover that it failed to submit any relevant facts or that it submitted incorrect information in a report, it shall promptly submit the missing or correct information.
14. All reports shall be signed as follows:
 - a. For a corporation; by a principle executive officer of at least the level of vice president;
 - b. For a partnership or sole proprietorship; by a general partner or the proprietor, respectively;
 - c. For a public agency; by either a principal executive officer or ranking elected official; or,
 - d. Their "duly authorized representative."
15. Any person signing a report makes the following certification, whether its expressed or implied:

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

16. By January 30 of each year, the discharger shall submit an annual report to the Regional Board. The report shall contain both tabular and graphical summaries of the monitoring data obtained during the previous year. The discharger shall discuss the compliance record and corrective actions taken, or which may be needed, to bring the discharge into full compliance. The report shall address operator certification and provide a list of current operating personnel and their grade of certification. The report shall inform the Board of the date of the Facility's Operation and Maintenance Manual (including contingency plans as described in Provision A.24.), of the date the manual was last reviewed, and whether the manual is complete and valid for the current facility. The report shall restate, for the record, the laboratories used by the discharger to monitor compliance with effluent limits and provide a summary of performance relative to section B, General Monitoring Requirements.

If the facility treats industrial or domestic wastewater and there is no provision for periodic sludge monitoring in the Monitoring and Reporting Program, the report shall include a summary of sludge quantities, analyses of its chemical and moisture content, and its ultimate destination.

If appropriate, the report shall also evaluate the effectiveness of the local source control or pretreatment program using the State Water Resources Control Board's "Guidelines for Determining the Effectiveness of Local Pretreatment Program."

17. The discharger must notify the Regional Board whenever there is a substantial change in the volume or character of pollutants being introduced into the wastewater system. Notice shall include information on the quality and quantity of waste being introduced to the system and the anticipated impact of the waste upon the quantity and quality of the aggregate discharge.
18. The discharger must notify the Regional Board as soon as it knows or has reason to believe that it or an indirect discharger has begun, or expects to begin, use or manufacture of a "toxic waste" or "hazardous substance" not reported in the Report of Waste Discharge that may, directly or indirectly, discharge into the treatment and disposal system.

D. Bypasses or Upsets

1. Bypass

- a. If the discharger knows in advance of the need for a "bypass," it shall submit notice to the Executive Officer at least 10 days before the "bypass."

b. Enforcement action will be taken against the discharger for "bypass" unless:

- (i) "Bypass" was unavoidable to prevent loss of life, personal injury, or "severe property damage";
- (ii) There was no feasible alternative to the "bypass," such as use of auxilliary treatment facilities, retention of untreated waste, or maintenance during normal periods of equipment down-time. (This condition is not satisfied if adequate back-up equipment could have been installed to prevent a "bypass" which occurred during normal periods of equipment down-time or preventive maintenance); and,
- (iii) The discharger submitted notice to the Executive Officer as specified in paragraphs C.3. and D.1.a., above.

2. Upset

A discharger seeking to establish the occurrence of an "upset" has the burden of proof. A discharger who wishes to establish the affirmative defense of "upset" shall demonstrate, through properly signed, contemporaneous operating logs or other relative evidence that:

- a. an "upset" occurred and the discharger can identify the specific cause(s) of the "upset"; and,
- c. the facility was at the time of "upset" being properly operated; the discharger submitted notice of "upset" within 24 hours; and the discharger took all reasonable steps to minimize or correct any adverse impact on the environment.

E. Enforcement:

1. The discharger must comply with all conditions of this order. Non-compliance violates state law and is grounds for enforcement action or modification of the existing order.
2. Any person failing or refusing to furnish technical or monitoring program reports as required by subdivision (b) of section 13267 of the California Water Code, or falsifying any information provided therein, is guilty of a misdemeanor.
3. The discharger and any person who violates waste discharge requirements and/or who intentionally or negligently discharges waste or causes or permits waste to be deposited where it is discharged into surface waters of the state may be liable for civil and/or criminal remedies, as appropriate, pursuant to sections 13350, 13385, and 13387 of the California Water Code.

4. Upon reduction, loss, or failure of any part of the wastewater facility, the discharger shall, to the extent necessary to maintain compliance with this order, control production or all discharges, or both, until the facility is restored or an acceptable interim method of treatment or disposal is provided. Should enforcement action be brought against the discharger, the necessity to halt or reduce the permitted activity in order to obtain compliance with the conditions of this order shall not be a defense.

F. Definitions:

1. "Average" or "Mean" is the arithmetic mean of daily concentrations over the specified period

$$\text{Average} = \frac{1}{N} (X_1 + X_2 + \dots + X_N),$$

in which "N" is the number of days samples were analyzed during the period and "X" is either the constituent concentration (mg/l) or flow for each sampled day. To be valid, "N" must be four or greater.

2. "Bypass" means the diversion of waste streams around any portion of a treatment facility to the disposal area or from the treatment facility to a nonauthorized location.
3. A "composite sample" is a combination of no fewer than eight (8) individual samples obtained at equal time intervals (usually hourly) over the specified sampling (composite) period. The volume of each individual sample is proportional to the flow rate at time of sampling. The period shall be specified in the Monitoring and Reporting Program ordered by the Executive Officer.
4. "Daily Discharge" means the discharge of a pollutant measured during a calendar day or during any 24-hour period reasonably representative of the calendar day for purposes of sampling.
5. "Daily Maximum" limit means the maximum acceptable concentration or mass emission rate of a pollutant measured during a calendar day or during any 24-hour period reasonably representative of the calendar day for purposes of sampling. Its normally compared with results based on "composite samples."
6. "Duly Authorized Representative" is one where:
 - a. the authorization is made in writing by a person described in the signatory paragraph (C.14:a,b, or c) of this document;
 - b. the authorization specifies either an individual or the occupant of a position having responsibility for the overall operation of the regulated facility, such as the plant manager; and,
 - c. the written authorization was submitted to the Regional Board.

14. "Pollutant-free wastewater" means infiltration and inflow, storm waters, and cooling waters and condensates which are essentially free of pollutants.
15. "Severe property damage" means substantial physical damage to property, damage to treatment facilities which causes them to become inoperable, or substantial and permanent loss to natural resources which can reasonably be expected to occur in the absence of a "bypass." It does not mean economic loss caused by delays in production.
16. "Sludge" means the solids, residues, and precipitates separated from, or created in, wastewater by the unit processes of a treatment system.
17. To "significantly contribute" to a waste discharge requirement violation means an "indirect discharger" must:
 - a. Discharge a daily pollutant loading in excess of that allowed by contract with the discharger or by state or local law;
 - b. Discharge wastewater which substantially differs in nature or constituents from its average discharge;
 - c. Discharge pollutants, either alone or in conjunction with discharges from other sources, which results in a waste discharge requirement violation or prevents sludge use or disposal; or,
 - d. Discharge pollutants, either alone or in conjunction with pollutants from other sources, that increase the magnitude or duration of waste discharge requirement violations.
18. "Toxic waste" means any toxic and persistent waste which falls within the following categories:
 - a. PCB's
 - b. Pesticides
 - c. Toxic Metals
 - d. Cyanides
 - e. Halogenated Organics
 - f. Non-halogenated volatile organics
19. "Upset" means an exceptional incident causing noncompliance with technology-based effluent limitations because of factors beyond the reasonable control of the discharger. It does not include noncompliance caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventative maintenance, or careless or improper operation.

7. A "grab sample" is defined as any individual sample collected in less than 15 minutes. "Grab samples" shall be collected during peak loading conditions, which may or may not be during hydraulic peaks.
8. "Hazardous substance" means any substance designated as hazardous or extremely hazardous in sections 66680 or 66685 of the California Administrative Code (Title 22, Division 4, Chapter 30, Article 9).
9. "Incompatible wastes" are:
 - a. Wastes which create a fire or explosion hazard in the treatment works;
 - b. Wastes which will cause corrosive structural damage to treatment works, including all wastes with a pH lower than 5.0 unless the works is specifically designed to accommodate such wastes;
 - c. Solid or viscous wastes in amounts which cause obstruction to flow in sewers, or which cause other interference with proper operation of treatment works;
 - d. Any waste, including oxygen demanding pollutants (BOD, etc), released in such volume or strength as to cause inhibition or disruption in the treatment works and subsequent treatment process upset and loss of treatment efficiency; and,
 - e. Heat in amounts that inhibit or disrupt biological activity in the treatment works or that raise influent temperatures above 40°C (104°F) unless the treatment works is designed to accommodate such heat.
10. "Indirect Discharger" means a nondomestic discharger introducing pollutants into a publicly owned treatment and disposal system.
11. "Log Mean" is the geometric mean. Used for determining compliance of fecal or total coliform populations, it is calculated with the following equation:
$$\text{Log Mean} = (C_1 \times C_2 \times C_N)^{1/N},$$
in which "N" is the number of days samples were analyzed during the period and any "C" is the concentration of bacteria (MPN/100 ml) found on each day of sampling. To be valid, "N" must be five or more.
12. "Median" is the value below which half the samples (ranked progressively by increasing value) fall. It may be considered the middle value, or the average of two middle values. To be valid, three or more values are required.
13. "Overflow" means the intentional or unintentional diversion of flow from the collection and transport systems, including pumping facilities, and from disposal areas.